REMEDIAL INVESTIGATION REPORT

OMC PLANT 2
Waukegan, Illinois

Remedial Investigation/Feasibility Study

WA No. 237-RICO-0528/Contract No. 68-W6-0025

April 2006

Executive Summary

This report presents the results of the remedial investigation (RI) activities completed at Outboard Marine Corporation (OMC) Plant 2 (Operable Unit 4) in Waukegan, Illinois. The work was performed for the U.S. Environmental Protection Agency (USEPA) in accordance with the statement of work for Work Assignment No. 237-RICO-0528.

The purpose of this RI report is to summarize the data collected during the investigation, document the physical and contaminant characteristics of the site, and present conclusions drawn from these characterizations regarding risk to the public health and the environment. The results of the RI will be used to formulate remedial action objectives and to provide the foundation for developing a feasibility study in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Contingency Plan.

Site Description

The OMC Plant 2 site is at 100 E. Seahorse Drive, Waukegan, Illinois. The 65-acre site includes a 1,036,000-square foot (ft^2) former manufacturing plant building (i.e., Plant 2) and several parking lot areas to the north and south of the building complex. The site includes two polychlorinated biphenyl (PCB) containment cells in which PCB-contaminated sediment (dredged from Waukegan Harbor in the early 1990s) and PCB-impacted soil are managed. The cells (the "East Containment Cell" and the "West Containment Cell") are located north of OMC Plant 2.

The site is situated in an area of mixed industrial, recreational, and municipal land uses. Currently, the nearest residences are about 0.3 mile west of the site up on a bluff. The OMC facility is bordered to the north by the North Ditch and North Shore Sanitary District and to the east by the public beach and dunes along Lake Michigan. Sea Horse Drive forms the southern site boundary. Railroad tracks operated by the Elgin, Joliet, and Eastern Railway Company, and the A. L. Hanson Manufacturing Company (formerly OMC Plant 3) are located to the west of OMC Plant 2.

Background

OMC designed, manufactured, and sold outboard marine engines, parts, and accessories to a worldwide market for many years. OMC Plant 2 was a main manufacturing facility for OMC—the major production lines used PCB-containing hydraulic and lubricating/cutting oils, chlorinated solvent-containing degreasing equipment, and smaller amounts of *hydrofluoric acid, mercury, chromic acid, and other similar chemical compounds.*

OMC filed for bankruptcy protection on December 22, 2000, and later abandoned the property after completing a limited removal action. In November 2001, the bankruptcy trustee filed a motion to abandon OMC Plant 2. USEPA conducted a site discovery inspection in spring 2002 to document the presence of numerous chemical compounds in

OMC Plant 2 and support the allegation of imminent and substantial endangerment. Based on the findings, USEPA and the State of Illinois filed a joint objection to the abandonment and alleged that the site posed an imminent and substantial endangerment to public health and welfare and the environment. The bankruptcy trustee negotiated an emergency removal action scope of work with USEPA and Illinois Environmental Protection Agency (IEPA) that was approved by the court on July 17, 2002. The waste removal activities for the OMC Trust were completed in November 2002 and Trust abandoned OMC Plant 2 property on December 10, 2002.

USEPA assumed control of building security and utilities on December 10, 2002 and commenced a removal action to clean up more of OMC Plant 2 in spring 2003.

The City of Waukegan took title to the OMC Plant 2 property in July 2005 and is responsible for maintaining the building, property, and operation and maintenance (O&M) of the containment cells.

Summary of Field Investigation

A field investigation was conducted at the OMC Plant 2 site between January and June 2005. The data collection activities included:

- An investigation of the building materials including collection of PCB wipe samples from porous and nonporous surfaces and concrete core samples to evaluate material handling and disposal options.
- An investigation of the storm sewers, including sediment sampling, to determine if they continue to discharge to Waukegan Harbor.
- Surface and subsurface soil sampling to define the nature and extent of contamination within the footprint of the building and surrounding areas.
- A membrane interface probe (MIP) investigation to delineate the extent of volatile organic compounds (VOCs) in the subsurface.
- Monitoring well installation and groundwater sampling to verify groundwater quality conditions, including data to determine if conditions are conducive for natural attenuation.
- An investigation to determine the extent of the dense nonaqueous phase liquid (DNAPL) encountered during the MIP investigation.

In addition to the CH2M HILL field investigations, the City of Waukegan and USEPA also collected soil samples from the dune area to the east of the site. Additional wipe sampling was also conducted in August 2005 within the triax building by the Conestoga-Rovers & Associates for the Waukegan Coke Plant Settling Defendants. These data were incorporated into the nature and extent of contamination and risk assessment discussions.

Major Findings

Physical Characteristics

The subsurface materials encountered include near-surface fill materials above a naturally occurring sand unit that overlies clay till. The fill deposit extends from 2 to 12 feet below ground surface (bgs). Underlying the fill is a poorly graded sand or silty sand to a depth of about 25 to 30 feet. This relatively permeable sand unit comprises an unconfined aquifer with a geometric mean hydraulic conductivity of about 2.0×10^{-2} centimeters per second (cm/sec) and an average porosity of about 30 percent. Beneath the sand unit is 70 to 80 feet of hard gray clay that forms the lower boundary of the unconfined aquifer.

Groundwater is shallow and was encountered at depths ranging between 2 and 7 feet, depending on the ground surface elevation. Groundwater flow is generally west to east across the northern portion of the site (toward Lake Michigan) and in the southern portion of the site groundwater flows toward the south (toward Waukegan Harbor). The horizontal gradient is flat beneath the building and increases toward the south. The overall average site gradient is estimated to be 0.002 foot per foot (ft/ft). The calculated groundwater velocities ranged from about 70 to 150 feet/year in the shallow zone and 6 to 30 feet/year in the deeper zone of the aquifer. The overall site average groundwater velocity is estimated to be about 70 feet/year. Vertical gradients between the shallow and the deeper portions of the aquifer are almost non-existent.

Nature and Extent of Contamination

The findings of the field investigation relative to the nature and extent of contamination at the OMC Plant 2 included the following:

- Results from the porous and nonporous wipe samples indicate that the building materials contain concentrations of PCBs exceeding the 10 micrograms per 100 square centimeters ($\mu g/100\ cm^2$) Toxic Substances Control Act (TSCA) disposal criteria, with the highest PCB concentrations in the old die cast and parts storage areas. Concrete core samples from the floor and paint chip and concrete samples from these areas indicate the presence of PCBs at concentrations exceeding the 50 milligrams per kilogram (mg/kg) TSCA disposal criteria. Analytical results indicate that metals and PCBs will not leach out of the concrete floor samples at concentrations exceeding Tiered Approach to Corrective Action Objectives (TACO) Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

- The manholes west of the corporate building to the triax building were found to contain varying amounts of standing water and large volumes of sediment. The plugging of the storm sewer pipe appears to be effectively preventing discharge directly to Waukegan Harbor. PCB concentrations exceeding 1 mg/kg were detected in samples from five of the seven storm sewer locations. The highest concentrations were found south of the triax building and just north of East Seahorse Drive.

- Concentrations of PCBs and carcinogenic polynuclear aromatic hydrocarbons (CPAHs) that exceed the TACO Tier 1 soil remediation objectives for residential properties (based on a direct contact pathway of exposure) were found in shallow soil. Elevated PCB concentrations exceeding 1 mg/kg (1 part per million [ppm]) were detected across the site and in the dune area east of the plant. The majority of PCB concentrations in the soil beneath the plant were consistent with where the wipe and concrete core samples indicated the presence of PCBs. The results confirm that the PCB-contaminated soils (greater than 10 ppm) in the parking lot area north of the building were removed as part of OMC's remediation. The additional areas containing PCB- and/or CPAH-contaminated soil include north of the plant in the vicinity of former loading docks and tank areas, and in the open area north of the trim building, the former die cast underground storage tank/aboveground storage tank (UST/AST) area, and the dune area east of the plant. Elevated concentrations of CPAHs were also found in the area surrounding the corporate building.

- DNAPL was encountered during the MIP investigation at one location and was comprised of 1,600 g/kg of trichloroethylene (TCE). The extent of the DNAPL was investigated and not found 50 feet around the MIP-027/SO-057 location. Concentrations of TCE indicative of residual DNAPL were detected in a saturated soil sample collected from SO-081 in the area of the chip wringer.
- Groundwater contamination is mainly related to the use of chlorinated solvents, primarily TCE, in manufacturing operations at OMC Plant 2. The MIP, soil, and groundwater investigations indicate that the distribution of chlorinated volatile organic compounds (CVOCs) is limited in extent and appears as isolated areas rather than a single plume. The MIP investigation identified five areas of which three (Areas A, B, and C) were confirmed by the soil and groundwater results. The CVOC plume extending south of the building does not appear to have migrated far offsite and does not extend to Waukegan Harbor. The components of the CVOC concentrations include TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride. The presence of TCE degradation compounds and results of natural attenuation parameters indicate that the TCE area is being degraded by anaerobic reductive dechlorination.
- The relative concentrations of site-related compounds (e.g., TCE and cis-1,2-DCE) and the predominance of compounds not detected in the groundwater samples indicate that volatilization from groundwater is probably not the major source of the VOCs detected in the soil gas samples or the indoor air samples from the Larsen Marine Service buildings.

Fate and Transport

The primary contaminant release and transport mechanisms occurring at the OMC Plant 2 site include:

- Volatilization of organic compounds from the building materials, soil and groundwater, and migration offsite through the atmosphere. Based on previous air sampling, PCBs may be volatilizing from the contaminated building material into the atmosphere. Volatilization of organic compounds from surface soil and groundwater is not considered a major loss mechanism based on physical properties of the surface materials.

- Leaching of contaminants from source materials, including DNAPL, into groundwater and subsequent dissolved phase transport to groundwater discharge areas such as surface water bodies (Lake Michigan or Waukegan Harbor) is considered the most significant transport mechanism occurring at the site.
- Surface runoff of contaminants to ditches, low lying areas, or surface water bodies by dissolving in stormwater runoff or by soil erosion. Based on the PCB contamination detected in the sediment in the north and south ditches, surface runoff has occurred in the past. Because of the site topography and the presence of the building, pavement, gravel, and vegetation covering most of the contaminated areas, the overall potential for current transport of contaminated soils into offsite surface waters by erosion and surface flow is limited. Future plans for site development including an Eco-Park that transitions to mixed marina-related commercial and residential use will also limit the continued transport of contaminated soils to offsite surface water. The need for additional site controls will be evaluated in the feasibility study.

The main contaminants in the surface soil (PCBs and CPAHs) tend to be persistent in the environment because they are slow to degrade and have low mobility. The contaminants in the groundwater (CVOCs) have a higher mobility and are detected further away from the source areas. Based on the typical distribution coefficient (K_d) values for TCE, cis-1,2-DCE, and vinyl chloride and an average sitewide velocity, these CVOCs are estimated to travel at an average rate between about 40 and 60 feet/year, assuming no degradation of the CVOCs.

The groundwater data collected indicate that the chlorinated "parent compound" in groundwater (TCE) is being degraded by anaerobic dechlorination to transformation products (cis-1,2-DCE and vinyl chloride). Additionally, final and nontoxic degradation byproducts, ethane and ethane, were also detected at the site. Other natural attenuation data (geochemical and biochemical parameters) provide further evidence that the CVOCs are degrading in groundwater. Reductions in total CVOCs in groundwater, increases in daughter products, and trends in site conditions indicate that degradation is occurring. Continued natural attenuation monitoring is recommended to confirm trends in natural attenuation data and to evaluate seasonal variability as part of the evaluation of monitored natural attenuation (MNA) as a potential remedial approach.

Human Health Risk Assessment

A human health risk assessment (HHRA) was prepared utilizing conservative assumptions, and feasible exposure pathways that were based on both current and potential future site use conditions. Use of these conservative assumptions (consistent with a reasonable maximum exposure scenario) was intended to overstate rather than understate the potential risks. The HHRA was performed initially using a risk screening analysis with risk-based concentrations obtained from USEPA Region 9's Preliminary Remediation Goal (PRG) tables and the State of Illinois TACO program. In addition to this streamlined screening approach, an exposure assessment and toxicity assessment were performed. These assessments were used to evaluate potential exposure pathways and receptors not addressed by the Region 9 PRGs or the TACO values, and to develop cumulative risk estimates for comparison with USEPA target risk reduction goals of excess lifetime cancer risks of 1×10^{-4} to 1×10^{-6} or a noncarcinogenic hazard index of 1. The results from comparison with the risk based values indicate several chemicals of potential concern, principally PCBs and CPAHs in soil, and CVOCs in groundwater.

Based on the current characterization data, the potential risks to human health were higher than USEPA's target risk reduction objectives in different portions of the site. The estimated risks are based on the assumption that remedial actions are not conducted to address the existing soil and groundwater concentrations. Under current conditions, there are no potentially complete exposure pathways with the exception of trespassers entering the OMC Plant 2 building. Potential contact with PCBs in building materials by these individuals is unlikely to represent human health risks higher than USEPA target risk reduction objectives.

The estimated future risks are also based on the assumption that the site is redeveloped for future residential and recreational uses as described in the City's Master Plan. Chemicals in soil potential driving risks within the footprint of the OMC Plant 2 building are principally PCBs and CPAHs. Chemicals in groundwater potentially driving risks are CVOCs, including TCE and vinyl chloride. PCBs in soil within proposed future recreational areas to the north and east of the OMC Plant 2 building drive potential human health risks in those areas.

The summary potential risks estimated by the HHRA are presented in Table ES-1.

Ecological Risk Assessment

The ERA evaluated whether contaminants present at the site and surrounding areas represent a potential risk to exposed ecological receptors. The spatial extent of the ERA encompassed both onsite and offsite terrestrial habitat that currently exists or may be created as part of future development at the site. The ERA evaluated potential risks to terrestrial plant communities, threatened and endangered plant species, soil invertebrate communities, reptiles, birds, and mammals. Risks to receptors in aquatic habitat in the dune area, Lake Michigan, and Waukegan Harbor were not considered in the ERA. The methods and approaches used in this ERA were developed from applicable USEPA' guidance for Region 5.

Based on the evaluation using conservative and more realistic exposure assumptions, potential risks from PCBs to ecological receptors currently exist in an isolated area in the offsite dunes area, and after future development in areas of created habitat with high concentrations of semivolatile organic compounds (SVOCs) and PCBs. In the offsite dunes area, an evaluation of the spatial distribution of PCBs in surface soil indicates a limited area associated with potential risks to soil flora, including threatened and endangered plant species, soil fauna, and small insectivorous mammals. However, following USEPA's proposed removal activities, risks to these receptors are considered acceptable, and no further investigation is required.

After future development, there are potential risks from SVOCs and PCBs to soil flora, including colonizing threatened and endangered plant species, soil fauna, and small mammalian insectivores if suitable habitat is created and the existing soil concentrations are reflective of post-development conditions. Potential onsite risks to ecological receptors after development can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for the remaining areas with concentrations exceeding the remedial action goals developed for the site.

TABLE ES-1
Executive Summary
Summary of Estimated Health Risks for Site Chemicals
OMC Plant 2

Exposure Scenario	Excess Lifetime Cancer Risk: COPCs Posing Carcinogenic Risk >1x10^{-4}	Pathway Driver	Total	Noncarcinogenic Hazard Indices: COPCs Posing Hazard Index >1	Pathway Driver	Total
Residential Soil Exposure						
Residential—Adult	--	--	--	--	--	0.2
Residential—Child	--	--	--	--	--	0.1
Residential—Lifetime (Child/Adult)	Benzo(a)pyrene, Dibenz(a,h)anthracene	O,D	**4E-04**	--	--	--
Residential Outdoor Air from Groundwater						
Residential—Adult	--	--	--	--	--	0.00004
Residential—Child	--	--	--	--	--	0.0001
Residential—Lifetime (Child/Adult)	--	--	5E-10	--	--	--
Residential Indoor Air from Vapor Intrusion						
Residential—Adult	Vinyl chloride	R	**6E-04**	TCE, Vinyl chloride	R	**3**
Residential Groundwater, General Use						
Residential—Adult	--	--	--	Arsenic, TCE, PCB-1248	O,D	**141**
Residential—Child	--	--	--	Arsenic, TCE, PCB-1248	O,D,R	**325**
Residential—Lifetime (Child/Adult)	Arsenic, TCE, Vinyl chloride	O,D,R	**2E-02**	--	--	--
Recreational Soil Exposure						
Recreational User—Adult	PCBs (1248, 1254, 1260), Benzo(a)Pyrene	D	**2E-04**	PCB-1254	D	**3**
Recreationa User—Adolescent	(individually <1x10-4)	--	**1E-04**	PCB-1254	O,D	**5**
Construction Worker Exposed to Soil						
Construction Worker	--	--	1E-05	--	--	0.5
Construction Worker Exposed to Groundwater						
Construction Worker	Vinyl chloride	D	**6E-04**	cis-1,2-Dichloroethylene, Vinyl chloride	D	**7**
Trespasser Exposure Scenario						
Trespasser—Adult	--	--	2E-05	--	--	--

Pathway Driver
O = Oral route (ingestion)
D = Dermal route
R = Respiratory route (inhalation)

-- Not Applicable

Bolded values indicate exceedance of 10-4 risk level or exceedance of threshold level of 1.0.

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Appendixes [on CD-ROM]

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Acronyms and Abbreviations

°C	degrees Celsius
$\mu g/cm^2$	micrograms per square centimeter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
µV	microvolt
AATS	Ann Arbor Technical Services, Inc.
AOC	area of concern
AST	aboveground storage tank
BCF	biological concentration factor
BERA	baseline ecological risk assessment
bgs	below ground surface
Bombardier	Bombardier Recreational Products, Inc.
BTEX	benzene, toluene, ethylbenzene, and xylene
CFR	Code of Federal Regulations
cm/sec	centimeters per second
COPEC	constituent of potential ecological concern
CPAH	carcinogenic polynuclear aromatic hydrocarbon
CRA	Conestoga-Rovers & Associates
CVOC	chlorinated volatile organic compound
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense nonaqueous phase liquid
DO	dissolved oxygen
ECD	electron capture detector
Eh	redox potential
ELCR	excess lifetime cancer risk
ERA	ecological risk assessment
FID	flame ionization detector
FSP	Field Sampling Plan
ft/ft	foot per foot
HHRA	human health risk assessment
HI	Hazard Index
HQ	hazard quotient
IDOC	Illinois Department of Conservation
IEPA	Illinois Environmental Protection Agency
MEK	methyl ethyl ketone
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MIP	membrane interface probe

MNA	monitored natural attenuation
mV	millivolt
NAPL	nonaqueous phase liquid
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPL	National Priorities List
O&M	operation and maintenance
OMC	Outboard Marine Corporation
ORP	oxidation reduction potential
OU	operable unit
PA	preliminary assessment
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PID	photoionization detector
ppb	parts per billion
ppbv	parts per billion by volume
ppm	parts per million
PRG	preliminary remediation goal
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RME	reasonable maximum exposure
Sigma	Sigma Environmental Services Inc.
SLERA	screening-level ecological risk assessment
SMDP	scientific management decision point
SOD	soil oxidant demand
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TACO	Tiered Approach to Correction Action Objectives
TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene (or trichloroethylene)
TCL	Target Compound List
TOC	total organic carbon
TSCA	Toxic Substance Control Act
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
VSI	visual site inspection
WCP	Waukegan Coke Plant

SECTION 1

Introduction

This remedial investigation (RI) report presents the results of the data collection activities completed and the assessment of risks at the Outboard Marine Corporation (OMC) Plant 2 (Operable Unit 4) in Waukegan, Illinois. The work was performed for the U.S. Environmental Protection Agency (USEPA) in accordance with the statement of work for Work Assignment No. 237-RICO-0528. The document is comprised of the following sections:

- Section 1 provides a general description of the site background and history, previous investigations and remediation, and an overview of the RI field activities and data collection objectives.
- Section 2 describes the physical setting of the site including the surrounding land use, geology, hydrogeology, and ecological characteristics.
- Section 3 consists of the chemical setting describing the nature and extent of contamination found in the building material, soil, groundwater, and air.
- Section 4 presents the fate and transport of representative site-related contaminants in the environment.
- Section 5 summarizes the findings of the human health risk assessment.
- Section 6 summarizes the findings of the ecological risk assessment.
- Section 7 provides the references cited in this document.

The following appendixes are provided electronically on a compact disk attached to this document:

- Appendix A contains the reports summarizing the investigations conducted for the City of Waukegan on the Lakefront Study Area, the eastern most portion of the OMC Plant 2 property.
- Appendix B contains the technical memorandums summarizing the individual investigation activities.
- Appendix C contains the data usability evaluation.
- Appendix D contains the report prepared by Conestoga-Rovers & Associates (CRA) summarizing the results of additional sampling conducted in the triax building.
- Appendix E contains the methods and assumptions for the human health risk assessment.
- Appendix F provides the detailed ecological risk assessment.

1.1 Site Description

The OMC Plant 2 site is situated in Sections 15 and 22, Township 45 North, Range 12 East, in the city of Waukegan, Lake County, Illinois. The plant is located at 100 E. Seahorse Drive on the east side of Waukegan, immediately adjacent to Lake Michigan[1] (Figure 1-1). The site consists of about 65 acres, upon which are situated a 1,036,000-square foot former manufacturing plant building and several parking lot areas to the north and south of the building complex.

The site includes two polychlorinated biphenyl (PCB) containment cells in which PCB-contaminated sediment (dredged from Waukegan Harbor in the early 1990s) and PCB-impacted soil are managed. The cells (the "East Containment Cell" and the "West Containment Cell") are located north of the plant. OMC performed the harbor dredging work under a 1988 Consent Decree with USEPA and the Illinois Environmental Protection Agency (IEPA) that also required the long-term operations and maintenance (O&M) of the containment cells.

The site is situated in an area of mixed industrial, recreational, and municipal land uses (Figure 1-2). The OMC facility is bordered to the north by the North Ditch and North Shore Sanitary District and to the east by the public beach and dunes along Lake Michigan. Sea Horse Drive forms the southern site boundary. Further to the south are Larsen Marine Service, Waukegan Harbor, the Waukegan Coke Plant (WCP) Superfund site, the National Gypsum Company, Bombardier Recreational Products, Inc. (Bombardier), and the City of Waukegan Water Plant. Railroad tracks operated by the Elgin, Joliet, and Eastern Railway Company, and the A. L. Hanson Manufacturing Company (formerly OMC Plant 3) are located to the west of OMC Plant 2.

1.2 History and Operations

A detailed discussion of the plant history, operations, and previous environmental investigations is presented in the *Field Sampling Plan* (FSP; CH2M HILL 2004). A historical summary is provided herein.

1.2.1 Plant History

OMC designed, manufactured, and sold outboard marine engines, parts, and accessories to a worldwide market for many years. Plant 2 was a main manufacturing facility for OMC, and the major production lines used PCB-containing hydraulic and lubricating/cutting oils, chlorinated solvent-containing degreasing equipment, and smaller amounts of hydrofluoric acid, mercury, chromic acid, and other chemical compounds.

Plant 2 was constructed in several phases between 1949 and 1975. The western part of the Plant 2 property was purchased from Elgin, Joliet, and Eastern Railway Company in 1948. The easternmost 47 acres of the property was purchased from Abbot Laboratories in 1956. The 18,000-square foot corporate headquarters building, which was constructed in 1958, housed OMC's corporate offices (TechLaw 2001).

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[1] Note: Additional addresses exist due to building extent.

OMC filed for bankruptcy protection under Chapter 11 on December 22, 2000, and ceased operations at Plant 2. After failing to reorganize, OMC began liquidation in August 2001 by shedding all of its assets, including its Waukegan-area properties. OMC Plant 1 was sold to Bombardier. OMC Plant 2 had no buyers, and in November 2001 the bankruptcy trustee filed a motion to abandon the facility. USEPA conducted a site discovery inspection in spring 2002 to document the presence of numerous chemical compounds in OMC Plant 2 and to support the allegation of imminent and substantial endangerment. Based on the findings, USEPA and the State of Illinois filed a joint objection to the abandonment and alleged that the site posed an imminent and substantial endangerment to public health and welfare and to the environment.

In August 2002, the OMC bankruptcy trustee, USEPA, and IEPA agreed to a settlement action whereupon the trustees would perform a limited number of cleanup actions inside the plant. The waste removal activities for the OMC Trust were conducted beginning in August 2002 and were completed in November 2002. Once the trustees completed the cleanup actions per the settlement agreement, they legally abandoned OMC Plant 2 property on December 10, 2002.

Bombardier, which owns the former OMC Plant 1, also purchased some assets within Plant 2 including machines and associated hydraulic fluids, cleaners, and paints. Bombardier removed assets of value, and disposed of waste materials associated with those assets during the OMC Trust's Plant 2 removal activities (Tetra Tech 2002).

USEPA assumed control of building security and utilities on December 10, 2002, and conducted additional interior cleanup work in spring 2003 to prevent the release of PCBs and other compounds into the environment. USEPA maintained electrical power to support O&M of the PCB containment cells until December 10, 2003, at which time the State took over O&M of the cells. USEPA and IEPA are also planning to expand the OMC National Priorities List (NPL) site description that includes Waukegan Harbor (Operable Units [OUs] 1 and 3) and the WCP site (OU2) to include the OMC Plant 2 as OU4.

The City of Waukegan took title to the OMC Plant 2 property in July 2005 and is responsible for maintaining the building, property, and O&M of the containment cells.

1.2.2 Description of Manufacturing Operations

Manufacturing operations at Plant 2 included aluminum smelting and holding; aluminum die casting; aluminum machining, polishing, and finishing; spray painting; assembly; parts washing; chromate conversion coating; and wastewater pretreatment. Activities previously conducted in Plant 2 included vapor degreasing, solvent distillation, coolant reclamation, aluminum scrap processing, and electroplating. A basement beneath the wastewater treatment room contains troughs used for chrome plating operations (Tetra Tech 2002).

Numerous floor and strip drains are present in Plant 2, particularly in the die cast areas. Drain systems are present around the die casting machines. When operational, the drains collected and conveyed spent die and machining lubricants to the subslab piping network and eventually to the machining lubricant recovery systems and waste storage areas (TechLaw 2001). Two sets of pipe chases (tunnels) are present beneath Plant 2: one at the eastern end where die casting was most recently conducted, and one at the western end. The eastern pipe chases run north-south and allow access to the subslab piping systems beneath the die casting machines that in turn conveyed spent die lubricants, tramp oils, noncontact cooling water, compressed air, and natural gas (TechLaw 2001). The eastern tunnels were observed to be of sound integrity but did contain surface water runoff from access ramps outside the building. Because the power to the building has been turned off, the sumps are no longer able to purge water from the eastern tunnels.

The piping networks within the western tunnel system were used until about 1975, when the die casting operations were moved to the eastern end of Plant 2. The die casting machines held PCB fluids in the hydraulic sump associated with each machine. Minor amounts of oils containing PCBs were released during operation of the machines. Some of the fluids entered the subslab piping within the concrete tunnels in the western end of the building, contributing to the PCB-contaminated sediment in Waukegan Harbor. The tunnels and associated piping beneath the western end of Plant 2 were never formally decommissioned or decontaminated. However, the north and south sections of storm sewers that extended into the parking lots beyond the limits of the Plant 2 building were decommissioned in 1977 by removing a section of the piping and the surrounding soils (URS 2000). Several other drains that had discharged to the North Shore Sanitary District have also been plugged.

Transformers

PCB fluids were also used in numerous transformers located outside, within, and on the roof of OMC Plant 2 (Figure 1-4). Seven PCB capacitors were also reportedly located within Plant 2 facility. PCB transformers mounted on the roof or on pads in the building were equipped with curbing. The transformers may have leaked fluids during their operation and released PCB fluids to plant drains and outfalls. Table 1-1 is a list of identified OMC Plant 2 transformers.

Solvent Degreasers

As mentioned previously, the plant activities also included vapor degreasing and solvent distillation. A review of plant records indicate that, from approximately 1969 to 1988, degreaser units that typically consisted of recessed stainless steel degreasing tanks, and some dedicated "stills" adjacent to each degreaser, were used to support plating activities. Solvent was generally moved within this area via aboveground and overhead lines. Recovered solvent was reintroduced into the degreaser solvent and still bottoms were periodically removed for offsite disposal at a collective annual rate of up to 50,000 gallons (TechLaw 2001). Records indicate that up to 17 degreasers were used in 1979.

In addition to the degreaser units, the facility had a distiller for the purpose of reclaiming solvents and a 5,500-gallon trichloroethylene (TCE) tank vault that was partially below grade. TCE was distributed to the various degreasers by the use of pipes that were run above ground to each unit. Prior to an initiative to reduce chlorinated solvent use in 1979, it is estimated that OMC used 130,000 gallons of TCE. The use of chlorinated solvents at the Plant 2 facility stopped in the mid-1980s (Willis 1998). The locations of the suspected chlorinated solvent handling areas, based on plant records, are presented in Figure 1-5.

Underground and Aboveground Storage Tanks

Historically, OMC Plant 2 used roughly 20 underground storage tanks (USTs) during operations. The USTs were primarily located outside the facility along the building exterior and contained oils, lubricants, solvents, #2 fuel oil, and other materials (Figure 1-5). During the 1970s, OMC installed six 15,000-gallon steel USTs along the east side of Plant 2. Five of the tanks for die lube and hydraulic oils were located in an area immediately east of the new die cast facility. One additional tank for hydraulic oil and die lube mix was located near the southern boundary of the parking area. Available information indicates that the identified USTs have been abandoned in place or removed. Reports indicate that several of the tanks that were removed had leaked and were reported to IEPA (URS/Dames & Moore 2000; Spectrum Engineering Incorporated 1998). The locations of the USTs, based on plant records, are presented in Figure 1-5.

Aboveground storage tank (AST) investigations have revealed that Plant 2 had numerous ASTs at various locations over the years. A total of 17 ASTs used for storing a variety of PCB materials at varying concentrations were located in the parking lot area north of the plant (Figure 1-5). In addition to product, these tanks were also used for storing waste PCB materials for unspecified periods. All PCB ASTs were reportedly removed in 1984 and only the secondary containment diking remains (TechLaw 2001). The other ASTs were found primarily within the OMC Plant 2 building and contained nitrogen, coolants, soap, oils, lubricants, gasoline, and other materials. These ASTs were routinely moved as plant operations and departments changed location.

1.2.3 Operational Permits

The OMC facility operated under a Part B Resource Conservation and Recovery Act (RCRA) permit. The permit identified the Hazardous Waste and Product Storage Building located at the southwest corner of the plant (Figure 1-3). Hazardous waste generated by OMC included a gas/oil/water mixture from skimming operations (D001), wastewater treatment sludge (F019/D007), lyfanite filters (D005/D006/D007), aerosol cans (D001), paint wastes (F005), paint sludge (D001/F003/F005), paint filters (F005), paint thinner methyl ethyl ketone (MEK) (F005), and a number of other specialized waste streams (TechLaw 2001).

Waste pretreatment was also conducted in Plant 2. Pretreatment consisted of hexavalent chromium reduction by sodium bisulfite addition, neutralization, metals precipitation, clarification, pH adjustment, and sludge removal. Wastewater generated from OMC Plant 2 was discharged into two sanitary sewer lines (S-2 and S-2A) as a tributary to the North Shore Sanitary District (TechLaw 2001).

Stormwater generated by OMC was discharged under a National Pollutant Discharge Elimination System permit. Stormwater discharges include rainwater from the roofs and parking lots, and various sources of noncontact cooling water. Most of OMC's stormwater outfalls discharged directly into Waukegan Harbor or Lake Michigan (Figure 1-6). Historical facility drawings show that several floor drains contained in Plant 2 were also routed through the outfalls (TechLaw 2001).

1.3 Previous Investigations and Remediation

The OMC Complex has been subject to investigation and remediation (primarily for PCBs) since the late 1970s. A large body of geologic, hydrogeologic, hydrologic, and chemical distribution information has been developed during these activities. The information from these previous environmental investigations and remedial activities has been summarized in the FSP (CH2M HILL 2004) and is briefly summarized below.

1.3.1 Waukegan Harbor Remediation

OMC used hydraulic fluid containing PCBs as a lubricant in its aluminum die casting machines from 1961 to 1972. Reports indicate that OMC purchased about 8 million gallons of hydraulic fluid that contained PCBs. During the manufacturing process, some of the hydraulic fluid spilled into floor drains that discharged to an oil interceptor system, which then discharged to the North Ditch, a tributary to Lake Michigan. Some of the hydraulic fluids containing PCBs escaped from part of the oil interceptor, diversion, and pump system and were released directly to Waukegan Harbor in the western end of former Slip 3. The discharge on the northern part of the property was to the Crescent Ditch (Figures 1-2 and 1-6). As a result, large quantities of PCBs were released into Slip 3 and on the OMC property into the North Ditch, Oval Lagoon, Crescent Ditch, and the parking lot. By the time the discharge pipe to the harbor was sealed in 1976, about 300,000 pounds of PCBs had been released into the Waukegan Harbor and another 700,000 pounds to the OMC property near the North Ditch. It has been estimated that hundreds of thousands of pounds of PCBs were discharged directly into Lake Michigan (USEPA 2002).

Waukegan Harbor and the North Ditch area (OU1 and OU3) were placed on the NPL in September 1983. In 1984, USEPA selected a remedy consisting of a mixture of onsite containment and offsite disposal, targeting three areas where large quantities of PCBs were discharged for remediation: the North Harbor and former Slip 3, the OMC parking lot, and the North Ditch/Crescent Ditch/Oval Lagoon area (see Figure 1-2). The PCB concentrations in Crescent Ditch, Oval Lagoon, and North Ditch ranged from 50 to more than 10,000 parts per million (ppm). Another area of concern was the 9-acre Parking Lot area north of Plant 2 with PCB concentrations between 50 and 5,000 ppm.

OMC financed a trust to implement the cleanup and to ensure performance of the requirements of the Consent Decree (dated April 1989). The final remedy included (USEPA 2002):

- Excavation and construction of a new boat slip (Slip 4) on the east side of the North Harbor on the WCP property for the relocation of Larsen Marine Service from Slip 3.
- Construction of cutoff walls to isolate PCB-contaminated materials and to make Slip 3 a permanent containment cell. Designated dredged harbor sediments were placed in Slip 3 for containment.
- Construction of two other containment cells (termed the East and West Containment Cells) on the OMC Plant 2 property (see Figure 1-2). The East Containment Cell encompasses the Plant 2 Parking Lot area and the land east of the lot. The West Containment Cell encompasses the Crescent Ditch and Oval Lagoon. Before

construction, all areas containing PCB contamination at concentrations greater than 10,000 ppm were excavated and removed for treatment. Soil excavated from the Parking Lot area did not require treatment before placement into the East Containment Cell because it did not exceed the treatment criterion. About 5,000 cubic yards of sediment and soil were removed from the North Ditch, 2,900 cubic yards from Oval Lagoon, and 3,800 cubic yards from Crescent Ditch.

- Placement of residual soils from the treatment of materials in hot spot areas by a low-temperature extraction procedure into the West Containment Cell, which was then closed and capped.
- Restoration of the North Ditch by excavation of designated sediments, placement of these sediments in the West Containment Cell, and backfilling of the North Ditch with clean sand.
- Installation and operation of an extraction well system at each containment cell to prevent the migration of PCBs from the cells by maintaining an inward hydraulic gradient. Treatment of extracted water using dedicated water treatment systems with discharge to the North Ditch or Waukegan Harbor.

Final construction activities for the Waukegan Harbor (OU1 and OU3) remedial action were completed in December 1994. O&M of the containment cells is ongoing.

1.3.2 UST and AST Investigations and Remediation

In November 1991, a routine tightness test detected a leak in UST Tank 2.6. This information was reported to IEPA, and the incident was assigned number 913462. However, this tank was mistakenly reported as Tank 2.4 that was a non-regulated, flow through, process tank. Upon internal inspection of the UST by tank cleaners, two small corroded holes were discovered in the bottom of the tank. Tank 2.6 was not placed back into service and remained out of service until its removal (Sigma Environmental Services Inc. [Sigma] 1993).

In 1993, OMC removed six USTs (including Tank 2.6) and performed a closure assessment. According to the assessment report, five of the tanks were in good condition upon removal. Two small holes were observed in the bottom of Tank 2.6. On the basis of soil staining, strong petroleum odors, and a sheen on groundwater entering the excavation, IEPA was notified that a release had occurred (Sigma 1993).

In November 1994, OMC conducted an additional investigation including completion of 31 soil borings to characterize residual soil impacts in the areas surrounding the USTs. Soil samples from the 2- to 4-foot depth interval (at or below the water table) consistently contained polynuclear aromatic hydrocarbons (PAHs) in the 1 to 15 ppm range (Ann Arbor Technical Services Inc. [AATS] 1997).

1.3.3 Chlorinated Solvent Plume Investigation

Historic solvent use at OMC Plant 2 resulted in chlorinated hydrocarbon impacts to the groundwater. A subsurface investigation was conducted in the spring of 1997 to identify the source and extent of chlorinated compounds in the groundwater in the vicinity of Plant 2. Soil and groundwater samples were collected in July 1997, primarily beneath the central part of Plant 2 and extending to the northern and western property boundaries. An offsite investigation was conducted in November 1997 on the Larsen Marine Service property south of the OMC corporate building. The investigation focused on the uppermost 30 feet of soil, terminating at the clay till boundary that apparently acts as a lower confining layer. The findings of the field investigation (Willis 1998) included the following:

- TCE and its daughter products cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride were identified in groundwater from Plant 2 at concentrations exceeding Illinois Tiered Approach to Corrective Action Objectives (TACO) Cleanup Objectives for Class I aquifers. Trace amounts of 1,1,1-trichloroethane (1,1,1-TCA) and 1,1-dichloroethane (1,1-DCA) were also detected.
- The distribution of chlorinated volatile organic compounds (CVOCs) in the shallow zone of groundwater indicates one or more sources are located in the central and northern parts of Plant 2, corresponding to the location of several former vapor degreasers that had operated at the facility. Another potential source area is a cooling pond formerly located in the northwestern corner of the Metal Working Area of Plant 2 (see Figure 1-3). A separate source area, possibly related to underground utilities near or in the former Crescent Ditch, contained TCE in the shallow zone west of the West Containment Cell.
- There is an occurrence of TCE within the deep zone that appears to be unrelated to the suspected source in the center of Plant 2. The area is located in the southwestern corner of the East Containment Cell. The reason for the presence of TCE there is unknown.
- CVOCs are distributed throughout the groundwater column.
- CVOCs appear to be migrating predominantly to the south and southeast towards Waukegan Harbor. CVOC contamination on the eastern part of the site (immediately south of the East Containment Cell) is likely migrating easterly toward Lake Michigan.

1.3.4 USEPA Preliminary Assessment and Visual Site Inspection

TechLaw, Inc. conducted a preliminary assessment (PA) and visual site inspection (VSI) for USEPA at OMC Plant 2 in July 2001. The PA/VSI was performed to identify environmental releases or potential releases from solid waste management units (SWMUs) and areas of concern (AOCs) that may require corrective action by the facility owner.

The potential environmental problems at the OMC Plant 2 identified in the VSI included:

- PCB-contaminated floors, walls, and ceilings in the old "die cast" building area
- Chlorinated solvents in substantial quantities beneath the building, especially where the self-proclaimed "world's largest vapor degreaser" was previously located
- A chlorinated solvent groundwater plume potentially migrating into Lake Michigan
- PCB-laden soils beneath the northern parking lot areas (the OU1 and OU3 PCB cleanup level was set at 50 ppm)
- Pipe chases leading to the harbor and elsewhere containing oily residue laden with PCBs

USEPA recommended that OMC conduct a RCRA Facility Investigation to determine the extent of these and other contaminated areas and to propose a clean-up remedy for the site (Lambesis 2001).

1.3.5 USEPA Discovery Site Visit and OMC's Removal Action

USEPA conducted a site discovery inspection in spring 2002 to document the presence of numerous chemical compounds in Plant 2 to support the allegation of imminent and substantial endangerment. As part of the effort, a site investigation was performed and onsite materials were inventoried to evaluate potential site-related threats to human health and the environment (Tetra Tech 2002). The waste removal activities for the OMC Trust were conducted beginning in August 2002 and were completed in November 2002. The completed tasks included removal and disposal of all drums and containers, draining of all tanks, draining and flushing of all transformers, draining and disposal of all hydraulic fluid remaining in machines, draining and disposal of all fluids in the chip wringer and hopper machine, and removal and disposal of all batteries and capacitors. The analytical results for the samples collected indicated that several areas required attention in terms of waste or product removal and decontamination.

1.3.6 USEPA Removal Action

USEPA assumed control of building security and utilities on December 10, 2002, and commenced a removal action between May 12 and July 11, 2003. USEPA's activities consisted of waste removal, floor decontamination, site security, O&M of the three sediment containment cells, tunnel inspections, soil and groundwater sampling, asbestos removal, and draining and disposal of PCB-contaminated transformer fluid. Wastes removed included hydraulic oil, machining oil, oily metal chips, sludge, compressed gasses, and waste decontamination water. The chip wringer pit, metal working floor, former parts storage area floor, and floor in the old die cast area were cleaned. Floor decontamination efforts reduced PCB concentrations on the floors, but remaining concentrations exceed standards in five of nine metal working area wipe samples collected following floor cleaning (Tetra Tech 2003).

1.4 Overview of the Remedial Investigation

OMC and USEPA have conducted multiple investigations at the site and in its vicinity. The existing data from these investigations were evaluated and used to develop a conceptual model of the existing site conditions. The conceptual models of the physical and chemical conditions at the site, based on the previous investigations, are presented in the FSP (CH2M HILL 2004). The FSP also discusses specific sampling objectives and approaches developed for each medium (building materials, soil, groundwater, and air) based on the conceptual model and future land use goals. Based on a review of existing data, the potential environmental issues and data needs for the OMC Plant 2 site RI include:

- The presence of PCB-contaminated metal structures and piping (i.e., nonporous surfaces), concrete block walls, painted metal walls, painted piping, painted girders (i.e., porous surfaces other than floors), and concrete floors in the old die cast, parts storage, and metal working areas. Additional sampling was conducted (the building materials investigation) to evaluate material handling and disposal options for PCB-contaminated building materials. The sampling was limited to that sufficient to determine the general proportion of material (e.g., metal, painted walls and piping, concrete, etc.) that will require decontamination, treatment, or to determine the type of landfill for offsite disposal. A risk evaluation based on the process described in the PCB Spill Cleanup Policy, 40 Code of Federal Regulations (CFR) 761.61(c) will be conducted to further address the PCB-contaminated materials.

- The condition of sanitary sewers and storm sewers that were reportedly plugged and decommissioned and/or not decontaminated and may be providing releases to Waukegan Harbor from the site. Sewer line dye tests were used to determine effectiveness of previous plugging and capping actions. In addition, sediment samples were collected from storm sewer manholes to evaluate if the sediments may act as a continuing source of PCBs to Waukegan Harbor and the South Ditch.
- The presence of PCB-contaminated sediment detected in the North Ditch requiring remediation—the volume of sediments requiring remediation was estimated during the soil and sediment investigation using sediment probes.
- The presence of contaminated soil (PCBs and carcinogenic polynuclear aromatic hydrocarbons [CPAHs]) previously detected in the vicinity of the former PCB AST area, northern parking lot areas, and the areas east of the former die cast UST and AST area. The soil and sediment investigation also included surface and subsurface soil sampling along the sand dunes east of OMC Plant 2 and beneath the building to define the nature and extent of contamination. The areas investigated and objectives of the investigation are presented in the *Soil and Sediment Investigation* technical memorandum presented in Appendix B.
- The presence of chlorinated solvents in soil and groundwater beneath the building where former solvent degreasers were located. Definition of hot spot areas beneath the building in soil and groundwater was completed during the RI soil and groundwater investigations. Soil samples were collected using soil probes; groundwater grab samples were collected from temporary piezometers and groundwater sampling was performed using low flow methods from permanent groundwater monitoring wells. The areas investigated and objectives of the investigation are presented in the *Groundwater Investigation Technical Memorandum* presented in Appendix B.
- A chlorinated solvent groundwater plume that is potentially migrating into Lake Michigan or Waukegan Harbor. The nature and extent of the plume and related exposure routes were defined during groundwater, soil, and soil gas investigations during the RI.

Additional elements used in developing the sampling approach included:

- The pre-RI data indicate that elevated concentrations of PCBs and CVOCs in the soil are likely to pose risks to human health that exceed both an excess lifetime cancer risk (ELCR) of 1×10^{-4} and a Hazard Index (HI) of 1. As a result, it may be possible to streamline the risk assessment by incorporating comparisons to USEPA's risk-based preliminary remedial goals (PRGs) or the State of Illinois' TACO remediation objectives to meet the requirements for a baseline risk assessment.
- Soil gas (volatilization from soil and groundwater) above the chlorinated solvent plume will pose an unacceptable risk to residents or workers in any future buildings

constructed within the footprint of the existing building (assuming no further action for volatile organic compound [VOC] remediation in soil and/or groundwater). Therefore, the construction of any buildings on the site would need to include controls to mitigate potential vapor intrusion. Vapor sampling from beneath the building was not proposed because results would not be representative of future conditions when the building no longer exists and potential soil or groundwater remedial activities have been implemented. However, screening values for the potential vapor intrusion pathway will be developed to aid in identifying areas where remediation might be needed to address this pathway.

Remedial investigation activities at Plant 2 began in January 2005 and were completed in June 2005; except for the storm sewer sampling that was completed November 2005. The field investigation was conducted to evaluate the impacts of OMC's historical operations and to verify and refine the extent and levels of residual contamination in the building materials in Plant 2, surface soil, subsurface soil, and groundwater. A summary of the RI field activities are presented in Tables 1-1 through 1-4. Technical memorandums summarizing the specific activities associated with each of the investigations are provided in Appendix B.

SECTION 2

Physical Site Setting

2.1 Local Demography and Land Use

2.1.1 Current Conditions

The current land use in the vicinity of OMC Plant 2 is primarily marine-recreational and industrial, but also includes utilities and a public beach east of the site (Figure 1-2). Waukegan Harbor, south of the site, is an industrial and commercial harbor used by lake-going freighters and recreational boaters. Presently, Slip 1 is the only operating slip for commercial traffic. The major portion of waterborne commerce in Waukegan Harbor is the receipt of building cement and gypsum that are offloaded from commercial ships in Slip 1 for the manufacture of wall board that are then distributed by land. Gold Bond Building Products (a division of National Gypsum), LaFarge Corporation, and St. Mary's Cement are the major commercial users of the harbor. Gold Bond Building Products stores gypsum in large outdoor piles north of Slip 1. St. Mary's Cement stores cement in silos located west of the slip, and LaFarge Corporation has silos located to the south of Slip 1.

Larsen Marine Service uses Slip 4 for repair, supply, and as docking facilities for private boats. Larsen Marine Service is the largest lakefront yacht dealer in the Chicago metropolitan area. The company provides yacht brokerage for new and used powerboats and sailboats, and offers marine repair services.

The Lake County Board and the City of Waukegan classified land use areas in Lake County in 1987. Land surrounding the northern portion of Waukegan Harbor has been classified as urban, while the beach areas and water filtration plant properties have been classified as open-space areas. The remaining land in the immediate harbor area is classified as special use (Lake County) or residential (City of Waukegan). Currently, the nearest residences are about 0.3 mile west of the site up on a bluff.

The site, surrounding properties, and the City of Waukegan obtain potable water from Lake Michigan. The city has no municipal potable wells. There are some private residential wells within the city limits at a distance from the site (URS 2000). The exact locations of these private residential wells are not known; however, based on the location of the site relative to the lake and residential areas and the regional and site-specific hydrogeological data, there are no residential wells that could be impacted by this site.

2.1.2 Future Land Use

In December 2000, OMC declared Chapter 11 bankruptcy, and began liquidation in August 2001. Subsequently, the City of Waukegan purchased the WCP site and also acquired the OMC Plant 2 property (Figure 1-2). The WCP and the OMC Plant 2 site has been rezoned to high-density-residential as part of the City's plan to revitalize the Waukegan lakefront area.

In December 2003, the City of Waukegan amended its 1987 Comprehensive Plan to include the *Waukegan Lakefront - Downtown and Lakefront Master Plan* and supporting documents prepared by Skidmore, Owings & Merrill, LLP and its consulting team (City of Waukegan Ordinance No. 03-O-140). The Master Plan and documents provided by the City of Waukegan were reviewed with respect to the anticipated future land use of the OMC Plant 2 and surrounding properties. The plan defines the northern portion of the OMC Plant 2 property as an "Eco-Park" development that transitions to mixed-use marina-related commercial and residential use on the southern portion of the property. Similar plans are anticipated for the WCP site. The City is in the early stages of its process of rezoning various lakefront parcels consistent with the Master Plan (Deigan 2004). A concept of the City's vision for the harbor area is presented in Figure 2-1.

2.2 Geology and Hydrogeology

2.2.1 Stratigraphy

The geologic data collected during the RI field activities are consistent with publicly available regional data and with the data collected during previous investigations on the site and on adjacent properties. The subsurface materials encountered during the investigations include near-surface fill materials above a naturally occurring sand unit that overlies a clay till. These unconsolidated materials overlie the uppermost bedrock in the area comprised of a sequence of dolomitic bedrock formations. The results of the properties of the subsurface materials are summarized in Table 2-1. Representative stratigraphic sections, developed from the borings shown in Figure 2-2, are presented in Figures 2-3, 2-4 and 2-5.

The uppermost materials include fills that were used to build up low-lying areas for development. The fill deposits extend to 2 to 12 feet below ground surface and typically consist of silty or clayey sand and/or gravel deposits with wood fragments, bricks, and other debris.

The naturally occurring material underlying the fill consists of sand and/or gravel to a depth of about 25 to 30 feet. These materials are part of the Equality Formation that was deposited as beach sand along the shore of former glacial Lake Chicago (IEPA 1994). The sand is typically described as either poorly graded (SP) or silty sand (SM). In general, the sequence appears to become finer with depth with the silty sands encountered in the lower half of the column. On average, the unit is described as containing 5 to 15 percent silt. Sand sizes range from fine to coarse. Some coarse sand lenses and also shell fragment zones occur, but not at consistent elevations across the site. Measured porosity values for the saturated sand unit range from about 19 to 41 percent with an average of 30 percent (see Table 2-1). A silty or clayey, sandy gravel (GM or GC), approximately 0.3 to 0.5 foot in thickness, is often noted in the interval immediately above the silty clay till.

Underlying the Equality Formation is the clay Wadsworth Till of the Wendron Formation, which is approximately 70 to 80 feet thick (IEPA 1994). The till extends from approximately 30 to 100 feet deep and consists of a hard or stiff gray, lean clay with sand and some gravel. The surface of the till is irregular, and generally slopes gently downward from west to east beneath the area, and is relatively flat from north to south. The contour map of the till surface presented in Figure 2-6 was generated based on information from soil and monitoring well boring data and cone penetrometer testing. Roughly 10 feet of vertical drop in the till occurs across the site from west to east. Variability in till surface elevation is evident where the data points are most dense. In situ permeability tests of the till indicate a horizontal and vertical coefficient of permeability at approximately 10^{-7} centimeters per second (cm/sec; Canonie 1991).

Regional information indicates that the Silurian-age dolomite comprises the uppermost bedrock in the area. Underlying the dolomite are the Maquoketa Group shales that act as an aquitard, separating the Silurian dolomites from deeper bedrock units (USEPA 1999).

2.2.2 Groundwater

Groundwater is encountered within the sands of the Equality Formation at depths ranging between 2 and 7 feet, depending on the ground surface elevation. This depth is heavily influenced by the surface water elevations present in Lake Michigan and the Waukegan Harbor. The underlying till unit forms the lower boundary of this unconfined aquifer and likely acts as a barrier to the vertical contaminant migration.

In situ hydraulic conductivity testing of the sand aquifer was performed at 36 well locations and included testing of the shallow and deep portions of the aquifer. Hydraulic testing methods and results are provided in the *In Situ Field Hydraulic Conductivity Testing* technical memorandum in Appendix B. A summary of the results is presented on Table 2-2. Shallow monitoring well screens typically crossed the water table such that the average hydraulic conductivity for the shallow zone, 2.16×10^{-2} cm/sec, is representative of the upper portion of the aquifer. Deeper well screens were typically situated to screen the lowest portion of the aquifer, just above the clay till. The average hydraulic conductivity for the deep zone is 4.56×10^{-3} cm/sec. The geometric mean for both shallow and deep wells is 2.0×10^{-2} cm/sec.

Groundwater elevation maps for the shallow and deep portions of the aquifer are presented on Figures 2-7 and 2-8, respectively. The horizontal groundwater flow direction in the shallow portion of the aquifer is from west to east across the northern portion of the site (toward Lake Michigan) under an average horizontal groundwater gradient of 0.001 foot/foot (ft/ft). Shallow groundwater flow direction in the southern portion of the site is toward the south (Waukegan Harbor) with an average horizontal gradient of 0.002 ft/ft. Based on the average porosity and the average hydraulic conductivity value (30 percent and 2.2×10^{-2} cm/sec, respectively), the average linear groundwater velocity for the shallow zone is estimated to range from 70 to 150 feet per year.

The groundwater elevation map for the deeper portion of the aquifer indicates a flow direction pattern similar to the upper zone, with a portion in the middle of the site showing a very flat gradient (0.0004 ft/ft). Outside of this area, average horizontal gradients in the deeper portion of the aquifer range from 0.0008 to 0.002 ft/ft. The average linear groundwater flow velocities, using an average porosity of 30 percent, range from approximately 6 to 30 feet per year across the site in the deeper zone.

Vertical gradients between the shallow and deep portions of the aquifer are almost non-existent in most places, ranging from a measured -0.065 ft/ft in the downward direction to 0.018 ft/ft in the upward direction (Table 2-3). However, 12 of the 18 well nests either register no difference in groundwater elevation between shallow and deep wells, or a negligible difference of 0.001 foot. This information confirms that the shallow and deep well locations are essentially monitoring the same aquifer.

2.2.3 Hydrology and Sediments

Surface water features near OMC Plant 2 include the North Ditch, South Ditch, Waukegan Harbor, and Lake Michigan. Local and regional surface water drainage eventually reaches Lake Michigan. Average annual precipitation is 34 to 36 inches per year based on data from 1961 to 1990 (CH2M HILL 2004).

As described in the FSP (CH2M HILL 2004), the sediment investigation was limited to probing the North and South ditches to determine the volume of sediments. Details of the sediment volume investigation and estimate are presented in the *Soil and Sediment Investigation* technical memorandum in Appendix B. The results of the sediment thickness measurements along each transect and the estimated sediment volume for the North and South ditches are approximately 3,477 and 731 cubic yards, respectively.

2.3 Ecological Setting

The most significant ecological features near the site include Lake Michigan, Waukegan Beach, and the Illinois Beach State Park. The Lake Michigan shoreline, including a portion of Waukegan Beach, is located east of the site. The Illinois Beach State Park is located about 1.5 miles north of the site. The locations of these ecological features are shown in Figure 1-1.

2.3.1 Lake Michigan

Lake Michigan provides a diverse aquatic habitat and supports commercial and sport fishery. Yellow perch and bloaters are harvested commercially. The Lake Michigan sport-fishing catch consists primarily of yellow perch; chinook and coho salmon; and steelhead, brown, and lake trout. Two state-threatened fish species, the longnose sucker and the lake whitefish, have been reported in Lake Michigan between Zion and Waukegan. The last sightings of these species were in 1985 for the longnose sucker and in 1991 for the lake whitefish (CH2M HILL 1995).

Waukegan Harbor is located west and south of the Waukegan Beach area. In the past, fishing advisories were posted at the Waukegan Harbor (based on PCB data from fish sampling), and post-remediation (after 1993) monitoring data indicated contaminant concentrations in fish had decreased (USEPA 2000). Results for carp in 2000 showed PCB concentrations in line with fish samples collected by other Lake Michigan states and the public has been warned not eat carp from Lake Michigan waters of Illinois (USEPA 2003). Factors that limit Waukegan Harbor's value as a habitat include regular industrial boat traffic that stirs up and muddies the harbor waters; dredging operations that disturb harbor sediments and affect surface water quality; and the lack of cover provided by the deep, vertical harbor walls (CH2M HILL 1995).

The Illinois Department of Conservation (IDOC) has been stocking salmon and trout into Lake Michigan near Waukegan Harbor since 1957 (CH2M HILL 1995). The stocked fish are released into the new harbor area just south of the Waukegan Harbor's southern breakwater (Figure 1-1). The salmon and trout migrate back to the release site during spawning season.

2.3.2 Waukegan Beach

General Description

Waukegan Beach is a sand and dune area east of the site that is used primarily for recreational purposes (i.e., beachcombing, swimming, picnicking, etc.). The beach extends north along the Lake Michigan shoreline to the Illinois Beach State Park (Figure 1-1). In the past, the City of Waukegan would periodically grade the beach to enhance recreational opportunities, resulting in a disturbance to the sand dune communities. The City has discontinued grading the beach, allowing the partial redevelopment of the dune communities (CH2M HILL 1995).

Historically, Lake Michigan occupied many portions of the Waukegan Beach area, but has receded over the years and exposed much of the fine to very fine sandy soils. A seawall barrier constructed from large cement and quarried boulders define the western limit of the beach area and former extent of Lake Michigan wave activity. Some of the concrete rubble breakwall adjacent to the Plant 2 site was removed by the City of Waukegan in June 2005.

Waukegan Beach is comprised of two general areas: Waukegan Beach east of OMC Plant 2 and north of the South Ditch, and Waukegan Beach south of the South Ditch and east of Seahorse Drive.

Waukegan Beach east of OMC Plant 2 has never been developed with surface structures and is generally inaccessible. Wooded areas have been re-established east of the former seawall barrier and extend from the North Ditch to the South Ditch. Most of the remaining portions of the Waukegan Beach east of this tree line are rolling sand dunes with sporadic tree and natural grass land cover that lead eastward to a gently sloping beach.

The southern portion of Waukegan Beach east of Seahorse Drive, especially near the shoreline south of South Ditch, is commonly used by the general public. This portion of Waukegan Beach has been developed with some structures located just east of the parking lot and a seawall barrier extending out into Lake Michigan serving as wave protection for outer portions of Waukegan Harbor.

In general, wetland vegetation communities are scattered throughout the Waukegan Beach area along Lake Michigan and are typically characterized by creeping juniper and nodding wild rye (CH2M HILL 1995).

Endangered, Threatened, or Rare Species

The Illinois Department of Natural Resources identified 13 plants species, 1 invertebrate species, and 5 bird species that are threatened or endangered (federal or state) and occur within 1 mile of OMC Plant 2 (Kieninger 2005). The bird species include the following: Henslow's sparrow, upland sandpiper, peregrine falcon, common tern, and the black-crowned night heron. The piping plover, ring-billed gull, brewer's blackbird, and yellow-crowned night heron may have also nested or attempted to nest at Waukegan Beach (CH2M HILL 1995). The piping plover is the only species known to have nested in the beach area east of the OMC Plant 2 site. A common tern nesting site is near the Commonwealth Edison Waukegan Power Plant, which is located about 1.5 miles north of the site. This is the only known common tern nesting colony in Illinois (IEPA 1994).

Four threatened or endangered plant species have been found at Waukegan Beach. The species are American sea rocket (*Cakile edentula;* state-threatened), seaside spurge (*Chamaesyce polygonifolia;* state-endangered), American beachgrass (*Ammophila breviligulata;* state-endangered), and Kalm's St. John's wort (*Hypericum kalmianum;* state-endangered). A naturalist with IDOC stated that suitable habitat exists for other rare plant species, even though they were not observed during a cursory survey (CH2M HILL 1995). Sea rocket and seaside spurge are adapted to sand pocket habitats and are likely to be found only as primary successional species of the upper reaches of a bare sand habitat. Beachgrass (also known as marram grass) may occur as high as the foredune, just beyond the upper reaches of the beach sand habitat, but is not likely to occur further inland, and serves the important function of stabilizing the sand dunes (CH2M HILL 1995). Beachgrass dominates the area, and is found evenly distributed dispersed in a near continuous cover across the entire area. Kalm's St. John's wort is represented by six to eight plants located in the southwestern corner of Waukegan Beach east of OMC Plant 2 (Diegan 2004).

Habitat and Biota of the Lakefront Study Area

The Lakefront Study Area refers to the 13-acre area on the easternmost side of the OMC Plant 2 property, extending from the North Shore Sanitary District's southern property boundary to the South Ditch. The North Shore Sanitary District's secondary outfall joins up with the North Ditch. Wind and wave action have shifted the drainage pattern of the North Ditch and carved a drainage swale across the northeastern portion of the area to Lake Michigan. A stormwater ditch and former OMC Plant 2 outfall forming the South Ditch is beginning to develop into a wetland area.

An environmental investigation, including habitat identification, was performed by Deigan & Associates, LLC for the City of Waukegan in July 2004. The resulting *Environmental Site Investigation Report* is included in Appendix A. A summary of the findings are presented below.

The area is characterized as being a dry sand prairie/foredune community dominated by marram grass, little bluestem grass (*Schizachyrium scoparium*) and sand reed (*Camlamovilfa longifolia*). Forb diversity (number of species and abundance of each species) is quite low with most of the species, often represented by only one or two individuals, occurring along a narrow strip on the west edge of the area.

Some depressional areas within the sand prairie/foredune community contain fairly large populations of lake shore rush (*Juncus baltisu littoralis*), suggesting that these areas are near the water table.

Three wetland areas are represented by drainage ditches on the north and south edges of the area and by a small depression along the North Ditch near the lakeshore. A narrow terrace along the north side of the South Ditch contained significant amounts of conservative wetland species including:

- Ohio goldenrod (*Solidago ohiensis*)
- Richardson's rush (*J. alpinus rariflorus*)
- Prairie wedge grass (*Sphenopholis obtusata*)
- Green twayblade orchids (*Liparis loeselii*)

2.3.3 Illinois Beach State Park

The Illinois Beach State Park is a 4,160-acre natural area situated along the Lake Michigan shore (Figure 1-1). The park contains a diverse habitat, including cattail marshes, sand prairies, and savannas. An avian ecological survey conducted in 1981 recorded 116 bird species within the park, and 91 were believed to be nesting within park boundaries (IEPA 1994). Other animals observed at the park include 28 species of mammals, 14 species of reptiles, and 9 species of amphibians (CH2M HILL 1995).

A listing of state-listed threatened and endangered species that have been recorded in the Illinois Beach State Park includes 12 endangered plant species, 2 threatened plant species, 3 endangered bird species, and 2 threatened bird species. Six federally listed threatened or endangered species that could potentially inhabit the park are also listed.

SECTION 3

Nature and Extent of Contamination

Several investigations have been conducted to evaluate the impacts of OMC Plant 2 on the surrounding environment. These investigations were conducted to either address specific concerns (e.g., USTs or the CVOC plume) or were limited in scope and do not individually provide a comprehensive model of the nature and extent of contamination. In order to take advantage of the existing data, a site-specific database was developed during the planning of the field investigation and is discussed in the FSP. Based on OMC's historical chemical use and operational practices, and using pre-RI and RI data, the potential impacts from OMC Plant 2 operations has been evaluated based on the following chemical groups:

- Total PCBs—the sum total of detected concentrations of the different PCB Aroclors.
- Total CVOCs—the sum total of detected concentrations of 1,1,1-trichloroethane; 1,1-DCA; 1,2-DCA; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; TCE; tetrachloroethene (PCE); vinyl chloride; and chloroethane. The presence of these compounds would be indicative of the impacts related to solvent use at the plant.
- Total BTEX—the sum total of detected concentrations of benzene, toluene, ethylbenzene, and total xylenes. The presence of these compounds would be indicative of potential impacts from petroleum hydrocarbons (e.g., gasoline and oils).
- Total CPAHs—the sum total of detected concentrations of carcinogenic polynuclear aromatic hydrocarbons including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The presence of these compounds would be indicative of heavier-end petroleum products (e.g., hydraulic oils, fuel oil).

The presence of contamination within the building materials, storm sewer sediment, soil, groundwater, soil gas, and indoor air are discussed below.

3.1 Building Investigation

The OMC Plant 2 building materials were sampled to evaluate material handling and disposal options. During removal activities conducted by USEPA, PCB contamination was identified in the old die cast, parts storage, and metal working areas. Building materials were grouped and sampled according to surface material porosity as defined in 40 CFR 761.

3.1.1 Nonporous Surfaces—Metal Structures and Piping

Wipe samples for PCB analysis were collected from metal structures, piping, and other nonporous surfaces (defined within 40 CFR 761.3 as a smooth, unpainted solid surface that limits penetration of liquid containing PCBs beyond the immediate surface) to determine the type of thermal treatment, disposal, or decontamination that may be required if contaminated (i.e., above 10 $\mu g/100\ cm^2$ Toxic Substances Control Act [TSCA] surface criteria established in 40 CFR 761). Sample locations and results are shown in Figure 3-1 with the prefix, "NPW" for "nonporous wipe sample."

Forty-nine wipe samples were collected from nonporous surfaces in the old die cast, parts storage, and metal working areas (Figure 3-1) and analyzed for PCBs. An additional 15 wipe samples for PCB analysis were collected from the trim building and new die cast area. Photographs of the materials sampled, observations during sample collection, and a description of sample collection procedures is presented in Appendix B. Tables with the wipe sample results are presented in Appendix C.

Old Die Cast Area

Seven wipe samples (NPW-017 through NPW-023) were collected from the old die cast area (Figure 3-1). Concentrations of PCBs detected range from 3.9 to 200 $\mu g/100\ cm^2$. The highest concentrations of PCBs were detected in NPW-017 (200 $\mu g/100\ cm^2$) on a metal wall support at the northern edge of the area and in NPW-023 (150 $\mu g/100\ cm^2$) on a metal overhead catwalk at the southern edge of the area. Three samples NPW-022, NPW-021, and NPW-018 had concentrations of PCBs less than 100 $\mu g/100\ cm^2$ but greater than 10 $\mu g/100\ cm^2$. PCBs were detected in the remaining two samples, NPW-019 and NPW-020, at concentrations less than 10 $\mu g/100\ cm^2$.

Parts Storage Area

Ten wipe samples were collected from nonporous materials in the parts storage area. Concentrations of PCBs detected range from 16 $\mu g/100\ cm^2$ (NPW-024) to 600 $\mu g/100\ cm^2$ (NPW-048). Concentrations of PCBs exceeding 100 $\mu g/100\ cm^2$ were detected at NPW-048 (600 $\mu g/100\ cm^2$) on a 1-inch-diameter overhead pipe, NPW-016 (540 $\mu g/100\ cm^2$) on an 8-inch-diameter overhead pipe, NPW-027 (430 $\mu g/100\ cm^2$) on a 4-inch-diameter overhead pipe, and NPW-028 (220 $\mu g/100\ cm^2$) east of NPW-027 on the same 4-inch-diameter overhead pipe. The 600 $\mu g/100\ cm^2$ of PCBs detected at NPW-048 was the highest concentration of PCBs detected in the building on a nonporous surface. Concentrations of PCBs greater than 10 $\mu g/100\ cm^2$ and less than 100 $\mu g/100\ cm^2$ were detected in the remaining seven wipe samples collected from nonporous materials in the parts storage area (NPW-015, NPW-024, NPW-025, NPW-045, NPW-046, and NPW-047).

Metal Working Area

Thirty-one wipe samples were collected from nonporous materials in the metal working area. Concentrations of PCBs detected range from 15 $\mu g/100\ cm^2$ (NPW-011) to 350 $\mu g/100\ cm^2$ (NPW-010). Concentrations of PCBs exceeding 100 $\mu g/100\ cm^2$ were detected at 13 of the 31 sample locations. Concentrations of PCBs greater than 10 $\mu g/100\ cm^2$ and less than 100 $\mu g/100\ cm^2$ were detected in the remaining 18 wipe samples collected from nonporous materials in the metal working area (Figure 3-1).

Trim Building

Five wipe samples (NPW-066 through NPW-070) were collected from nonporous materials in the trim building. Collecting wipe samples from the trim building was not a component of the original building investigation; however, wipe samples from the trim building were added because concentrations of PCBs in nonporous wipe samples collected from the eastern edge of the metal working area exceed 10 $\mu g/100\ cm^2$.

Concentrations of PCBs detected in the five samples ranged from 19 μg/100 cm^2 (NPW-066) to 85 μg/100 cm^2 (NPW-068) as indicated on Figure 3-1.

New Die Cast Area

Ten wipe samples (NPW-071 through NPW-080) were collected from nonporous materials in the new die cast area. Because materials containing PCBs were not reportedly used in the new die cast area, collecting wipe samples from the new die cast area was not a component of the original building investigation. Wipe samples from the new die cast area were added because concentrations of PCBs in nonporous wipe samples collected from the eastern edge of the metal working area exceed 10 μg/100 cm^2.

Concentrations of PCBs detected in the new die cast area range from 0.71 μg/100 cm^2 to 17 μg/100 cm^2. Due to the high ceiling in the new die cast area, wipe samples were not collected from nonporous surfaces near the ceiling. Wipe samples from the new die cast area were collected from a maximum height of 30 feet due to equipment limitations.

3.1.2 Porous Floor Surfaces

Core samples were collected from concrete floors and analyzed for PCBs to determine the depth to which PCBs may have penetrated into the porous floor materials, the disposal requirements for the concrete, and the potential for residual PCBs and metals to leach from the concrete. Figure 3-2 includes the core sample locations with the prefix "CB." Note that "total PCB" concentrations are plotted on this figure, but that Aroclor 1248 is the only PCB isomer detected within the concrete cores. Unless otherwise noted, concrete samples were collected from the top of the concrete floor to a depth of 4 inches.

Core samples were collected from the chemical storage building, the old die cast area, the parts storage area, the metal working area, the new die cast area, and the triax building floor and analyzed for PCBs (Figure 3-2). Core samples from five locations were also analyzed for metals and submitted to be analyzed for metals and PCBs using the Synthetic Precipitation Leaching Procedure (SPLP). Photographs of the materials sampled, observations during sample collection, and a description of sample collection procedures is presented in Appendix B. Tables with the core sample results are presented in Appendix C.

Chemical Storage Building

Two concrete samples were collected from one concrete core location (CB-021) in the chemical storage building (Figure 3-2). After the location was cored and the core was removed, a plastic liner was observed 4 inches below the top of the concrete floor. Beneath the liner, the concrete was visibly stained purple. Based on these observations, two concrete samples were collected for PCB analysis, one from 0 to 4 inches and a second from 4 to 5 inches below the top of the concrete floor. PCB concentrations were reported as 6.6 milligrams per kilogram (mg/kg) in the sample collected from the top 4 inches and at 280 mg/kg in the 4- to 5-inch depth sample. The PCB concentrations in CB-021 correlate with the purple staining observed during concrete coring.

Old Die Cast Area

Six concrete core samples were collected from five locations in the old die cast area. PCB concentrations in concrete core samples range from 1.4 to 2,100 mg/kg. At some locations, the concrete cuttings and cores were visibly stained purple. Purple color was observed during coring activities at CB-001 (0.3 to 0.6 foot [520 mg/kg]), CB-009 (1,400 mg/kg), CB-014 (240 mg/kg), and CB-018 (2,100 mg/kg). No purple staining was observed at CB-013 (1.4 mg/kg). At some coring locations in the old die cast area, the former concrete floor surface had been covered with an additional 1 to 3 inches of new concrete. Based on PCB analytical results, some correlation exists in the old die cast area between visual purple staining on the concrete floor samples and elevated PCB concentrations.

Two concrete core samples (C-013 [PCB at 1.4 mg/kg] and C-014 [PCB at 240 mg/kg]) from the old die cast area were submitted to be analyzed for SPLP PCBs and metals. The SPLP testing did not result in detectable concentrations of PCBs and metal concentrations were at levels below the TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

Parts Storage Area

Six concrete core samples were collected from five locations in the parts storage area (Figure 3-2). PCB concentrations in core samples collected from the parts storage area floor range from 2.7 to 970 mg/kg. Sample CB-022 contained the highest concentration of PCBs (970 mg/kg) and was collected near a transformer in a hallway south of the main parts storage area. Purple staining was observed on concrete cores collected from CB-002, CB-015, and CB-022. Contrary to other site data, the purple staining observed in core samples CB-002 (22 mg/kg) and CB-015 (19 mg/kg) did not correlate with samples with the highest PCB concentrations.

One concrete core sample (C-015 [PCB at 19 mg/kg]) from the parts storage area was submitted to be analyzed for SPLP PCB and metals. The SPLP testing did not result in detectable concentrations of PCBs and metal concentrations were at levels below the TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

Metal Working Area

Ten concrete core samples were collected from 10 locations in the metal working area. PCB concentrations in core samples collected from the metal working area range from 0.31 mg/kg at CB-011 to 35 mg/kg at CB-003. Purple staining was observed on concrete cores collected at CB-003 and CB-012. No correlation between PCB concentrations in concrete samples collected from CB-003 (35 mg/kg) and CB-012 (9.2 mg/kg) and the purple staining observed at these locations is evident. In general, PCB concentrations were higher near the northern edge of the metal working area than the samples collected from the central and southern portions.

Two concrete core samples (C-011 [PCB at 0.31 mg/kg] and C-008 [PCB at 1 mg/kg]) from the metal working area were submitted to be analyzed for SPLP PCBs and metals. The SPLP testing did not result in detectable concentrations of PCBs and metal concentrations were at levels below the TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

New Die Cast Area

One concrete core sample (CB-006) was collected in the northwest portion of the new die cast area. The sample location was selected to coincide with the location of a wipe sample collected during USEPA removal activities. PCB concentrations in CB-006 are 0.64 mg/kg. No purple staining was observed at CB-006.

Triax Building Floor

Four concrete floor wipe samples were collected from four locations in the triax building (Figure 3-3). The wipe samples were collected as a preliminary screening of the triax building for possible reuse as a wastewater treatment building for the WCP Superfund site. PCB concentrations in the four samples were PW-062 (26 $\mu g/100\ cm^2$), PW-063 (6.8 $\mu g/100\ cm^2$), PW-064 (10 $\mu g/100\ cm^2$), and PW-065 (16 $\mu g/100\ cm^2$).

Additional wipe sampling in the triax building was performed by CRA in August 2005 as part of the groundwater treatment plant design for WCP. Two of the five samples collected from the floor or the floor/wall interface within the triax building contained detectable levels of PCBs (5.6 and 19 $\mu g/100\ cm^2$). The wipe results from the CRA investigation are included in Appendix D.

3.1.3 Porous Surfaces Other Than Floors

Wipe samples were collected from porous surfaces (defined within 40 CFR 761.3 as "...any surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal; corroded metal;..."), such as concrete block walls, painted metal walls, painted piping, and painted girders. Wipe sample locations of these porous surfaces (other than floors) are shown on Figure 3-3 with the prefix "PW." The wipe samples were analyzed for PCBs, and the results were evaluated to determine appropriate handling and disposal of porous building materials. Photographs of the materials sampled, observations during sample collection, and a description of sample collection procedures is presented in Appendix B. Tables with the sample results are presented in Appendix C.

Old Die Cast Area

Six wipe samples were collected from porous surfaces in the old die cast area (Figure 3-3). PCB concentrations ranged from 5.5 to 170 $\mu g/100\ cm^2$. The highest concentrations of PCBs detected, 170 $\mu g/100\ cm^2$ at PW-061 and 150 $\mu g/100\ cm^2$ at PW-041, were of painted overhead piping near the southern end of the old die cast area. Wipe samples collected from PW-060 and PW-022 contained PCBs at concentrations of 14 and 15 $\mu g/100\ cm^2$, respectively, both exceeding the 10 $\mu g/100\ cm^2$ TSCA surface criteria established in 40 CFR 761. Wipe samples collected at PW-040 and PW-039 contained PCBs at concentrations of 5.5 and 9.4 $\mu g/100\ cm^2$, respectively, below the TSCA criteria for PCBs on porous surfaces.

Because PCB concentrations exceeded the 10 $\mu g/100\ cm^2$ TSCA criteria for porous surfaces in the old die cast area, paint chip samples were collected to determine disposal requirements for the materials. Paint chip samples were collected from the materials at PW-041 and PW-061. PCB concentrations in the paint chip samples were 600 mg/kg at PW-041 and 810 mg/kg at PW-061. At both locations, the concentrations of PCBs in the paint chip samples were higher than the concentration of PCBs in the wipe sample and exceeded the 50 mg/kg limit for disposal as a non-TSCA waste.

Parts Storage Area

Eleven wipe samples were collected from porous surface locations within the parts storage area (Figure 3-3). Concentrations of PCBs detected on porous surfaces in the parts storage area range from less than 0.01 to 750 $\mu g/100\ cm^2$. The highest concentrations of PCBs were detected on a concrete wall at PW-020 (750 μg/100 cm^2) and a light fixture at PW-025 (710 μg/100 cm^2). The PCBs detected at PW-020 are located approximately 100 feet west of PW-019, where PCBs were not detected. PCB concentrations less than 10 μg/100 cm^2 were detected at PW-019 (less than 0.01 μg/100 cm^2), PW-038 (4.1 μg/100 cm^2), and PW-058 (5.7 μg/100 cm^2).

Concrete and paint chip samples were collected from select locations in the parts storage area, where PCB porous media wipe concentrations exceeded 10 μg/100 cm^2, to determine disposal requirements for the material. Concrete chip samples were collected from PW-020 and PW-059 and paint chip samples were collected from PW-023, PW-025, PW-042, and PW-043. PCB paint/concrete chip concentrations versus porous wipe concentrations for the same locations are as follows:

Station Location	Total PCB Wipe Sample ("PW" Porous Surface) Concentration (μg/100 cm^2)	Corresponding Total PCB Paint/Concrete Chip Sample Concentration (mg/kg)
PW-020	750	99
PW-023	250	730
PW-025	710	13
PW-042	140	190
PW-043	98	92
PW-059	200	64

There is no apparent correlation between porous surface material and PCB concentrations in wipe and/or paint and concrete chip samples in the parts storage area.

Metal Working Area

Forty-three wipe samples for PCBs were collected from porous surfaces in the metal working area. Concentrations of PCBs detected in wipe samples collected from porous surfaces range from <0.01 to 540 μg/100 cm^2. PCB concentrations detected in the metal working area are summarized on Figure 3-3. PCB concentrations above 10 μg/100 cm^2 were detected in the southern and western portions of the metal working area. Wipe samples collected from porous surfaces in the northeastern portion of the metal working area did not contain PCB concentrations greater than 10 μg/100 cm^2. The northeastern portion of the metal working area appeared to have been painted recently. The recent paint or preparation of the surfaces for painting may have resulted in the low PCB concentrations detected in the wipe samples. No paint chip samples were collected from this portion of the metal working area.

Paint chip samples were collected from locations PW-015 and PW-026 within the metal working area to determine disposal requirements for the materials because wipe samples from porous surfaces contained concentrations of PCBs greater than 10 μg/100 cm^2. Paint chip detections versus porous wipe sample concentrations for these two locations are as follows:

Station Location	Total PCB Wipe Sample ("PW" Porous Surface) Concentration (µg/100 cm^2)	Corresponding Total PCB Paint Chip Sample Concentration (mg/kg)
PW-015	47	190
PW-026	540	11

No apparent correlation exists between PCB concentrations in wipe samples and paint chip samples in the metal working area.

Triax Building

Additional wipe sampling from the walls, roof truss members, and the flat roof of the internal buildouts within the triax building was also performed by CRA in August 2005. Four of the 14 samples collected from within the triax building contained detectable levels of PCBs ranging from 4.8 to 16 µg/100 cm^2. The results indicate that the PCBs were detected on the horizontal surfaces, roof truss members, and the flat roof of the internal buildouts. PCBs were not detected on the vertical surfaces. The wipe results from the CRA investigation are included in Appendix D.

3.1.4 Sewer Testing

The investigation of the storm and sanitary sewers included removing manhole covers to visually inspect manholes west of the corporate building to the triax building and inspecting the harbor area on the Larsen Marine Service property to determine potential sewer outfall points (Figure 3-4).

The manholes were opened and visually inspected to determine inflow and outflow directions. Piping was followed to the next manhole using the results of the visual inspection. Manholes were found to contain varying amounts of standing water and large volumes of sediment. The inspection results indicated that storm sewers near the corporate building drain to the east to a manhole located immediately north of Seahorse Drive and south of the triax building. From this manhole, a pipe leading south was observed and was found to discharge to Waukegan Harbor on the Larsen Marine Service property.

After determining the final outfall point of the storm sewers, a manhole located west of the corporate building and immediately east of the truck scale was inspected. Historical investigation reports indicate the sewer pipe was plugged south of this location. This plug, if present, would prevent site drainage from entering the storm sewer system with final outfall to Waukegan Harbor. After visual inspections of the manhole were completed, approximately 80 gallons of a water and tracer dye mixture were put into the manhole to determine if the plug reportedly installed downgradient of the area was effective. Two hours after adding the dye solution in the manhole, no dye was observed in the harbor or other downgradient manholes. Based on the testing, the plugging of the sewer pipe south of the test location appears to effectively prevent discharge from this storm sewer line directly to Waukegan Harbor.

As a result of the visual inspections of the storm sewers, sediment samples were collected in November 2005 for PCB analysis from seven storm sewer manholes located south of OMC

Plant 2 (Figure 3-4). Sediment generally consisted of silty sand with trace organic material and ranged from 4 to 30 inches in thickness. PCBs were detected in all of the sediment samples ranging from 0.2 to 130 mg/kg (Table 3-1). Concentrations of PCBs greater than 1 mg/kg were detected in the storm sewer manholes located east of the corporate building and just north of East Seahorse Drive. The storm sewer in this area is reported to discharge to the east into the South Ditch or may extend south beneath the Larsen Marine Service property and discharge to Waukegan Harbor. The sampling procedures and results are in the *Storm Sewer Sediment Investigation* technical memorandum provided in Appendix B.

3.1.5 Building Investigation Conclusion

This section presents conclusions of the building materials investigation. Conclusions related to the building materials are presented separately because the objectives of the sampling were to evaluate disposal options and not to determine the extent of contamination.

Nonporous Surface Investigation Conclusions

Analytical results from wipe sampling indicate nonporous metal surfaces with concentrations of PCBs exceeding the 10 $\mu g/100\ cm^2$ TSCA disposal criteria are present throughout the OMC Plant 2 building, with the exception of the northeast corner of the metal working area where nonporous surfaces were not present. In addition, nonporous surfaces in the old die cast, parts storage, and metal working areas have concentrations of PCBs exceeding the second-tier TSCA disposal criteria of 100 $\mu g/100\ cm^2$.

PCBs were detected in nonporous samples throughout all sampled building areas, but at wide-ranging concentrations. The general trend of detected PCBs on nonporous surfaces indicates the highest concentrations in the old die cast and parts storage areas with concentrations decreasing outward from this zone. A low percentage (about 14 percent) of wipe samples contained concentrations of PCBs below the TSCA disposal criteria of 10 $\mu g/100\ cm^2$.

The large volume of contaminated nonporous materials in the building coupled with the wide range of concentrations within building areas makes delineating areas of nonporous materials requiring special handling unfeasible. As a result, for future demolition and/or disposal purposes, all nonporous building materials will be considered to require special handling and/or disposal under TSCA regulations.

Porous Floor Investigation Conclusions

Concrete samples collected from concrete floors within the OMC Plant 2 building indicate the presence of PCBs at concentrations exceeding the 50 mg/kg TSCA disposal criteria established in 40 CFR 761. The distribution of PCBs in concrete generally coincides with wipe sample results in the old die cast and parts storage areas, which have the highest detected concentrations that decrease outward. Concentrations of PCBs exceeding 50 mg/kg appear to be limited to concrete floors in the old die cast and parts storage areas or to approximately 25 percent of the total building floor area. Concentrations of PCBs below 50 mg/kg were detected in concrete floors in all areas of the plant. Some correlation exists between purple staining observed during coring activities and elevated PCB concentrations in the concrete floors in the old die cast and parts storage areas.

Because PCBs were detected in samples of the concrete floors from all areas of the plant, the potential exists for PCBs to become mobilized as a component of dust generated during any activities disturbing the concrete floors. For disposal purposes, it is assumed that all concrete from the old die cast and parts storage areas will require disposal in a RCRA Subtitle C hazardous waste landfill or a TSCA chemical waste landfill per 40 CFR 761.

Management of concrete located outside the old die cast and parts storage areas will require controls to prevent exposure to PCBs in concrete dust generated during removal activities. Concrete from outside the old die cast and parts storage areas with PCB concentrations less than 50 mg/kg can be disposed of in a RCRA Subtitle D landfill or evaluated for onsite disposal.

Analytical results indicate that metals and PCBs will not leach out of the concrete floor samples at concentrations exceeding TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

Porous Surfaces Other Than Floors Investigation

Wipe sample results for porous surfaces other than floors indicate PCBs were detected in the old die cast, parts storage, and metal working areas of the OMC Plant 2 building. Paint chip and concrete samples were collected to determine disposal requirements for the materials where concentrations greater than 10 $\mu g/100\ cm^2$ were detected in wipe samples from porous surfaces. Concentrations of PCBs exceed the TSCA disposal criteria for solids of 50 mg/kg in eight of the ten concrete and paint chip samples.

Wipe samples collected from the white painted room in the northeast portion of the metal working area did not contain PCB concentrations greater than 10 $\mu g/100\ cm^2$; however, PCBs were detected in the porous materials in this area. For disposal purposes, the porous materials from this area will be considered uncontaminated and disposed of in a RCRA Subtitle D solid waste landfill or evaluated for onsite disposal. Any activities in this area that disturb the porous surfaces may mobilize the PCBs, resulting in a potential exposure hazard.

PCB contamination exceeding the 50 mg/kg TSCA disposal criteria was detected in eight of ten samples of the porous OMC Plant 2 building materials. For disposal purposes, it is assumed that 80 percent of the porous materials in the building will exceed the 50 mg/kg TSCA disposal criteria. Materials containing concentrations of PCBs greater than 50 mg/kg will be disposed of in a RCRA Subtitle C hazardous waste landfill or a TSCA chemical waste landfill.

3.2 Membrane Interface Probe Investigation

A membrane interface probe (MIP) investigation including 95 locations on the OMC Plant 2 site and surrounding properties was conducted in accordance with the FSP. The specific objectives of the investigation were to:

- Define the nature and horizontal and vertical extents of the VOCs in soil and groundwater using real-time measurements, specifically around previously identified hot spots, beneath the plant and to the south of the plant.
- Identify groundwater monitoring well locations to monitor the groundwater plume.

- Determine if nonaqueous phase liquid (NAPL) exists beneath the high concentration areas and potential source areas identified in previous investigations.

The MIP system provides real-time responses to VOC contamination in soil and groundwater. Based on historical data, the MIP was equipped with three detectors including a flame ionization detector (FID), a photoionization detector (PID) and an electron capture device (ECD). In general, the responses of the PID and ECD were best suited to indicate the presence of CVOCs. The FID response was useful for detecting BTEX constituents but was susceptible to elevated readings due to the occurrence of methane in the subsurface. The FID was able to detect CVOCs when concentrations of CVOCs were high enough to be combustible as at MIP-027, where dense nonaqueous phase liquid (DNAPL) was encountered. Temperature and soil conductivity were also recorded with depth at each location. A description of the activities (e.g., selection of locations and procedures) and the plots of the FID, PID, and ECD responses for each location are provided in the *Membrane Interface Probe Investigation* technical memorandum in Appendix B.

Because the MIP detectors provide a relative response value (in microvolts [μV]) and not a direct concentration of VOCs in the soil or groundwater, confirmation samples representing both high and low concentration areas were collected from approximately 10 percent of the MIP locations and submitted for laboratory analysis. For use in field decision making, the results of the confirmation samples and the MIP responses were compared to provide the relative magnitude of VOC concentrations corresponding to the baseline, maximum and intermediate MIP responses.

The analytical results from confirmation samples indicate the MIP system responded to VOC concentrations in groundwater as low as 4 micrograms per liter (μg/L; MIP-026/SO-046), meeting the project requirements to define the extent of contamination. An upper response limit for the MIP system was also determined based on analytical results from confirmation samples. The maximum MIP detector response of 8.0×10^6 μV for the ECD and 2.2×10^7 μV for the PID was recorded at total VOC concentration levels (as identified in laboratory samples) of approximately 5,000 micrograms per kilogram [μg/kg] or 5,000 μg/L (parts per billion [ppb]). The MIP locations where the maximum response level was recorded for at least one of the MIP detectors are indicated on Figure 3-8.

3.2.1 Results

The results of the PID and ECD responses are presented in Figures 3-5 and 3-6, respectively. The PID and/or ECD responses above 7.5×10^5 μV have been highlighted to delineate the areas of elevated CVOC concentrations. A three-dimensional view of the ECD responses is presented in Figure 3-7.

Based on MIP detector response and analytical results of the confirmation samples, five primary areas of CVOC contamination were identified, as indicated on Figure 3-8, including:

- <u>Area A</u>: Beneath the western portion of the trim and triax buildings, including areas immediately west of the trim and triax building and areas outside of the plant south of the triax building (MIP-047, MIP-048, MIP-069, MIP-054, MIP-059).
- <u>Area B</u>: Area near the chip wringer on the north side of the building (MIP-001, MIP-085).

- Area C: Northeastern portion of the former metal working area beneath the building (MIP-012 and MIP-021) and the open area immediately outside the building to the east (MIP-027) and north of the trim building.
- Area D: Northern portion of the old die cast area (MIP-014, MIP-015, MIP-079).
- Area E: Area southwest of the main plant (MIP-043).

PID and/or ECD responses above baseline levels were recorded at MIP locations outside these five areas; however, the level of the response was orders of magnitude less than the responses within the five primary areas.

Area A–West End of the Trim and Triax Buildings

Elevated PID and ECD readings were recorded at MIP locations beneath the western portion of the trim and triax buildings, extending slightly to the west of the triax building and south beneath the parking lot area outside the triax building and onto the Larsen Marine Service property. Elevated readings, greater than 1.0×10^6 µV, were detected at MIP-039 (trim building), MIP-047, MIP-048 (triax building), MIP-069, MIP-054, and MIP-059 (south parking lot area). In general, elevated PID and ECD readings from locations in the building (MIP-039, MIP-047, and MIP-048) were detected from depths of approximately 2 feet to the top of the till surface at approximately 30 feet (inside the building). These elevated responses throughout the entire soil column indicate that the source of the Area A contaminants may be the degreasers formerly located in western end of the trim building (see Figure 1-5).

The elevated detector readings from locations adjacent to and from beneath the parking lot area south of the triax building (MIP-054, MIP-059, and MIP-069) were recorded at slightly greater depths and also extended vertically to the top of the till (i.e., from roughly 10 to 26 feet below ground surface [bgs]). Elevated PID and ECD readings were also recorded south across the parking lot area in MIP-070, MIP-068, and to a lesser extent MIP-056, MIP-053, and onto the Larsen Marine Service property (MIP-063). MIP locations to the east, west, and north of this area (MIP-037, MIP-045, MIP-046, MIP-071, or MIP-077) did not exhibit elevated PID or ECD readings and serve to define the contaminated area.

Based on the MIP readings recorded in this area, a dissolved CVOC plume extends from approximately the northwest corner of the triax building south-southwest onto the Larsen Marine Service property. This plume is likely related to TCE used in the solvent-vapor parts degreaser formerly located in the west end of the trim building.

Area B–Chip Wringer Area

The chip wringer is located on the north side of the building, in the western portion of the metal working area. In addition to the chip wringer itself, this area was specifically targeted to investigate the potential impacts of a 4,000-gallon TCE UST that was reportedly located in this area of the plant. The investigation included three locations, two inside (MIP-084 and MIP-085) and one immediately outside (MIP-010) of the chip wringer room. Additional locations were located outside the room to examine potential downgradient impacts from solvent use in this area.

Elevated PID and ECD readings were recorded at MIP-085, south of the chip wringer near the base of the aquifer (21 to 28 feet bgs). Low to moderate level PID and ECD readings were recorded at MIP-019 located 160 feet southeast of MIP-085 from a depth of approximately 16 feet to the top of the till at 32 feet. No elevated PID or ECD readings were recorded north (MIP-010), west (MIP-084), east (MIP-011), or south (MIP-018) of the chip wringer. The limited extent of the elevated PID and ECD readings indicate CVOC contamination is present immediately beneath the chip wringer and extends approximately 200 feet to the southeast.

As part of the soil investigation a saturated soil sample was collected from SO-081 near MIP-085 and analyzed for VOCs. The saturated soil sample was collected from 25.0 to 26.9 feet bgs. Analytical results indicate 1,200,000 µg/kg of TCE was detected in the sample. The concentrations of TCE detected in SO-081 are indicative of residual TCE DNAPL in the soil/water matrix, not of mobile DNAPL as detected at MIP-027. The DNAPL concentrations were not detected by the MIPs advanced in the chip-wringer area indicating the extent of the residual DNAPL is limited.

Area C–Eastern Metal Working Area

This area includes the northeastern-most portion of the metal working area and the adjacent open area outside the building. Elevated PID and ECD readings were recorded beneath the building at MIP-021 and MIP-026 and outside the building at MIP-022, MIP-027, and MIP-089 (Figure 3-4). The elevated readings beneath the building at MIP-021 extended throughout the soil column, from approximately 2 to 30 feet bgs. At MIP-026, about 200 feet south, the elevated PID and ECD readings were recorded over two depth intervals: 2 to 6 feet bgs and approximately 15 to 23 feet bgs. The magnitude of the detector responses at MIP-026 were similar with the responses recorded for MIP-021. Groundwater grab samples collected at MIP-021 and MIP-026 confirm high VOC concentrations ranging from 48.5 µg/L in MIP-21 (the interval 29 to 33 feet bgs) to 34,600 µg/L in MIP-026 (the interval 13 to 17 feet bgs). No elevated PID or ECD readings were recorded at surrounding MIP locations inside the building including MIP-020, MIP-025, MIP-033 or MIP-034. While no high detector readings were recorded at MIP-012 confirmation sample analytical results indicate VOC concentrations greater than 10,000 µg/L.

The investigation to delineate the contamination continued outside the building to the north (MIP-088 and MIP-089) and to the east (MIP-022 and MIP-27). PID and ECD detector response at MIP-088, north of MIP-021, was minimal. The MIP detector response at MIP-022 was similar in magnitude to that at MIP-021, indicating that the high-concentration VOC contamination extended to the east at depths of 10 to about 22 feet bgs. PID and ECD detector response at MIP-089 was slightly higher than at MIP-088, but was much less than the magnitude of the response at MIP-021 and MIP-022. No elevated PID or ECD readings were recorded at MIP locations to the east (MIP-090 and MIP-091), thus bounding the contaminated area.

Elevated PID, ECD, and FID readings at MIP-027 were recorded at the base of the aquifer from approximately 26.5 feet to the top of the till at 28.5 feet. Confirmation samples were collected at this location to determine if an NAPL was present. During confirmation sample collection from the base of MIP-027, a dark brown/black oily DNAPL was collected and analyzed. Analytical results indicate that the DNAPL is comprised of approximately 100 percent TCE. The additional investigation to delineate the extent of the DNAPL is discussed in Section 3.4.3.

MIP-035 was installed about 100 feet to the south of MIP-027. No elevated PID or ECD readings were recorded at this location. Because DNAPL migration is controlled largely by gravity, MIP-075 was performed at the point of the lowest till surface elevation in the vicinity of MIP-027. No DNAPL was detected at MIP-075 based on MIP response; in addition, no PID, ECD, or FID response above baseline was recorded.

Based on the limited number of MIP locations with elevated PID and ECD readings, the VOC contamination appears limited to a small area at the western edge of the courtyard and eastern end of the metal working area of the plant. Based on MIP response, the elevated VOCs in this area appear to be unrelated to the VOCs detected in the chip wringer and trim building areas.

Area D–Northern Portion of the Old Die Cast Area

The old die cast area refers to the western portion of the plant where die casting was historically performed prior to relocating the die cast operations to the newer eastern portion of the plant. Elevated PID and ECD readings were detected at MIP-014, MIP-015, and MIP-079 extending from approximately 25 feet bgs to the top of the till at 30 feet bgs. The elevated MIP detector response is potentially related to a former solvent degreasing pit in the area of MIP-014; however, no elevated PID or ECD readings were recorded in shallow soils or groundwater in the area. The magnitude of the detector responses at MIP-016 and MIP-017 are less than the detections at MIP-014 and MIP-015. Based on the detector responses at MIP-016 and MIP-017, the CVOC plume in the northern portion of the old die cast area is independent of the plume detected near the chip wringer area.

No elevated PID or ECD readings were recorded at MIP-013 (northwest of the elevated readings), MIP-029 and MIP-030 (south of the elevated readings), MIP-018 (east of the elevated readings), or MIP-007 and MIP-008 (north of the elevated readings). The lack of elevated readings at MIP locations surrounding MIP-014, MIP-015, MIP-016, MIP-017, and MIP-079 defines the extent of the elevated readings. Based on the MIP response, the VOC plume extends approximately 400 feet east, but less than 200 feet south from MIP-014.

Area E–Southern Portion of the Old Die Cast Area

Elevated PID and ECD readings were recorded at MIP-043 at the southern end of the old die cast area. No elevated PID or ECD readings were recorded at MIP-030 (north of MIP-043), at MIP-073 (west of MIP-043), MIP-072 (east of MIP-043), or MIP-087 (south of MIP-043). A solvent degreaser pit historically located near MIP-043 may be the source of elevated MIP detector response readings in this area.

3.2.2 MIP Investigation Conclusions

The MIP effectively delineated the extent of VOCs in the subsurface at the OMC Plant 2 site. Samples collected from select MIP locations allowed correlation of MIP detector response to quantitative VOC concentrations. Based on analytical results from the correlation samples, the MIP had a lower detection limit of 4 µg/L and the detectors reached a maximum response at VOC concentrations of 5,000 µg/L.

Based on MIP results, five primary, independent, areas of VOC contamination were identified including the western portions of the trim and triax buildings, the chip wringer area, the eastern metal working area, the north end of the old die cast area, and the south end of the old die cast area. MIP points located between these five areas showed no detection of VOCs, indicating the areas are from individual sources and not part of one larger plume resulting from one source.

Mobile DNAPL was indicated by the detector response and confirmed by sample collection at MIP-027. Laboratory analytical results indicate the DNAPL is approximately 100 percent TCE. The responses from MIP points performed near MIP-027 were not indicative of DNAPL. The additional investigation to delineate the extent of the DNAPL is discussed in Section 3.4.3.

Residual DNAPL was indicated by a saturated soil sample collected at SO-081, near MIP-085. Analytical results indicate the residual DNAPL is primarily TCE. The results of MIPs advanced near MIP-085 are not indicative of mobile DNAPL "pools" as at MIP-027. The low level MIP detector responses at MIPs near MIP-085 indicate the extent residual DNAPL is limited.

3.3 Soil Analytical Results

Soil samples were collected from the OMC Plant 2 site to:

- Define the nature and extent of contamination,
- Support the assessment of potential risk to human health and the environment, and
- Determine whether remedial actions are necessary.

The data reported from previous investigations at OMC Plant 2 provide a relatively well-defined picture of soil and sediment contamination outside the building. A limited and focused field investigation was conducted to fill in data gaps identified based on evaluation of existing data. The specific objectives of the limited soil investigation were to:

- Define the eastern contamination (CPAH and PCB) boundary of the former die cast UST/AST area located east of Plant 2.
- Characterize soils in the vicinity of the PCB AST area and parking lot areas north of Plant 2 (between the two containment cells) sufficiently to evaluate the potential for direct contact risk.
- Verify that soils in the uncovered grassy areas surrounding the corporate office buildings south of Plant 2 will not pose direct contact risk related to site-related contaminants.
- Determine contaminant concentrations in soil beneath the building at selected groundwater investigation locations.
- Collect soil property data to evaluate contaminant fate and transport and remedial technologies.

A description of the activities (e.g., selection of locations and procedures) for the soil sampling is provided in the *Soil and Sediment Investigation* technical memorandum in Appendix B. Soil samples were analyzed for VOCs, semivolatile organic compounds (SVOCs), metals, and PCBs. In addition, selected samples were collected and analyzed for geotechnical parameters including total organic carbon (TOC), soil oxidant demand (SOD), bulk density, porosity, and grain size (see Table 2-1). The analytical results for the soil samples are provided in Appendix C.

Table 3-2 provides a summary of the compounds detected in soil, their concentration range, and the number of times each compound was detected. The TACO Tier 1 Remediation Objectives for Residential Properties for the direct contact pathway (soil ingestion and inhalation) and the soil component of the groundwater ingestion exposure route values (Class I aquifers) for the detected constituents are also provided in Table 3-2. The Tier 1 remediation objectives are presented for comparison purposes to identify the site-related compounds to be used to define the nature and extent of contamination at the site.

The frequency of detection and the comparison between the maximum concentration and the Tier 1 objectives verify that the main contributors to direct contact exposure include the PCBs and the CPAHs. Compounds from these chemical classes were the most frequently detected and were found at concentrations exceeding the Tier 1 Soil Remediation Objectives for the direct contact pathway. The concentrations of CPAHs and CVOC in the soil will also need to be addressed to reduce impacts to groundwater quality. Based on the frequency of detections of the CVOCs, the determination of the soil remediation goals will also need to consider the volatilization to air as an exposure pathway.

3.3.1 Polychlorinated Biphenyls

Soil samples for PCB analysis were collected from beneath the OMC Plant 2, the PCB area north of the plant, the grassy areas south of the plant, areas west of the plant, and the former die cast UST area east of the plant. Soil samples were generally collected from the top 0.5 feet of soil and from the 2-foot interval above the water table. Figures 3-9 and 3-10 present analytical results for soil samples collected for PCB analysis from the surface soil (i.e., 0- to 0.5-foot interval) and the subsurface (i.e., depth interval greater than 0.5 foot), respectively.

Beneath the Plant

Seventeen subsurface soil samples for PCB analysis were collected from six sample locations beneath the OMC Plant 2 building. PCBs were detected in the uppermost soil samples collected in five of the six locations (SO-069, SO-070, SO-071, SO-081, and SO-082). PCB concentrations ranged from 0.110 mg/kg at locations SO-069 and SO-071 (0 to 1.7 feet bgs and 4 to 5 feet bgs, respectively) to 16 mg/kg in a soil sample collected at SO-082 (4 to 5 feet bgs). The PCB concentrations decreased with depth, and only two of the deeper soil samples (8 to 8.7 feet) contained detectable levels of PCBs. The majority of the locations containing PCBs were beneath the old die cast area where wipe and concrete cores samples also indicated the presence of PCBs. The highest concentration (16 mg/kg at SO-082) was located beneath the portion of the old die cast area where 1.4 to 2,100 mg/kg of PCB were detected in the concrete core samples.

PCB Area North of the Plant

In the PCB area north of the plant, 73 soil samples were collected for PCB analysis from 36 soil sample locations. PCBs were detected in 34 of the surface soil samples collected from the 0- to 6-inch interval at concentrations ranging from 0.0082 mg/kg (SO-027) to 880 mg/kg (SO-014). The analytical results indicate that the majority of the most contaminated soils appear to have been removed as part of OMC's remediation of the North Ditch/Crescent Ditch/Oval Lagoon Area and the Parking Lot Area. Three isolated samples (SO-001, SO-007, and SO-008) of 10 locations from this remediated area contained PCB concentrations exceeding 1 mg/kg (1 ppm), ranging from 1.0 to 3.5 mg/kg. The 1.0 mg/kg concentration is the Illinois TACO Tier 1 limit for PCBs in soil based on a direct contact exposure route (35 Illinois Administrative Code 742.510). The highest concentrations of PCBs in the surface soils were detected at SO-014 (880 mg/kg) and SO-015 (32.8 mg/kg) located along the northwestern building wall and may be related to former loading docks or UST areas.

The other area with surface soil samples exceeding the 1.0 mg/kg criteria is in the open area north of the trim building. Five of the samples collected from this area contained elevated concentrations of total PCBs (0.860 to 7.750 mg/kg). Three of the samples (SO-026, SO-032, and SO-034) contained total PCB concentrations greater than the Tier 1 limit of 1.0 mg/kg. The distribution of the elevated PCB concentrations is not indicative of a contiguous source area related to the former PCB ASTs.

PCBs were detected in 28 samples collected from the soil interval above the water table (i.e., at depths greater than 0.5 foot) in the PCB area north of the plant. The PCB concentrations in the subsurface soils ranging from depths of 0.3 to 3 feet appear higher than in the surface soils with 14 locations containing PCB concentrations of or greater than 1.0 mg/kg. These elevated PCB concentrations were found in two locations (SO-001 and SO-006) in the vicinity of the West Containment Cell, along the building (8 of 9 samples exceeded 1.0 mg/kg), and in the open area north of the trim building (of 7 of 14 samples exceeded 1.0 mg/kg). The highest concentrations of PCBs in samples collected from above the water table were found at SO-014 (480 mg/kg in 1.5 to 2.0 feet) near the northwest corner of the building and at SO-025 (790 mg/kg in 2.2 to 2.5 feet) in the parking area just east of the PCB AST area.

Grassy Area South of the Plant

Sixteen samples (12 unsaturated and 4 saturated soil samples) for PCB analysis were collected from five soil sample and two geotechnical boring locations in the grassy area south of the plant. PCBs were not detected in any of the five surface soil samples (collected from the 0- to 6-inch interval).

Low levels of PCBs ranging from 0.031 to 1.8629 mg/kg were detected from subsurface soil samples at three locations collected from depths between 0.4 and 3.8 feet. The highest concentration (1.8629 mg/kg) was detected in the 2.1- to 2.4-foot interval from a location in the parking lot south of the triax building. The shallower soil sample (0.4 to 0.8 feet bgs) at this location contained 0.715 mg/kg of PCBs.

Areas West of the Plant

Three samples for PCB analysis were collected from one sample location in the unpaved gravel area north of the chemical storage building. PCBs were detected in SO-064 in the sample collected from 0 to 1 foot bgs at 9.400 mg/kg and 0.120 mg/kg in the deeper sample (4.6 to 6 feet bgs). The source of the PCBs at this location is not unknown, as no USTs were reported located in this area.

Former Die Cast UST Area East of the Plant

Eighteen samples for PCB analysis were collected from 10 soil sample locations in the former die cast UST area east of the plant. PCBs were detected in eight samples collected from 0 to 0.5 foot bgs. Concentrations of PCBs in the surface soil samples (0 to 0.5 foot) ranged from 0.062 to 49.500 mg/kg. Concentrations of PCBs in samples collected from 0 to 0.5 foot were highest at SO-043 (49.500 mg/kg) and SO-042 (17.700 mg/kg) near the northeast corner of the site in the vicinity of the East Containment Cell.

PCBs were detected in nine unsaturated soil samples collected from the interval above the water table (i.e., depths greater than 0.5 foot). Concentrations of PCBs in samples collected from depths between 0.6 and 3 feet ranged from 0.134 to 33.750 mg/kg. The highest concentrations of PCBs in the subsurface soil samples were detected at SO-043 (33.750 mg/kg) and SO-042 (31.200 mg/kg).

Four soil locations (SO-037 to SO-040) along the eastern fence line and two in the southeastern corner of the site (SO-035 and SO-036) were sampled to define the lateral extent of previously identified PCB contamination related to the former die cast UST/AST area east of the plant. The historical PCB data indicate that elevated PCB concentrations exceeding 1.0 mg/kg exist in the near surface soil (samples collected from the 0- to 2-foot interval). The results from the six locations indicate that concentrations generally decrease toward the fence line. Two of the surface soil locations (SO-037 and SO-040) contained total PCB concentrations slightly greater than 1.0 mg/kg criteria (1.800 and 1.097 mg/kg, respectively). Concentrations in the deeper soils (1 to 2 feet bgs) contain higher concentrations of PCBs with five of the six samples containing PCB concentrations (1.005 to 6.340 mg/kg) exceeding the 1.0 mg/kg criteria.

Four additional borings (SO-041 to SO-044) were sampled to the north of the former die cast UST/AST area following the north-south access road. Three of the surface soil samples contained elevated total PCB concentration in the surface soil (4.010 to 49.500 mg/kg). The subsurface soil samples at the same locations also contained elevated PCB concentrations (3.580 to 33.750 mg/kg). The data are consistent with the findings from the City of Waukegan's investigation of the dune area.

The City of Waukegan conducted an environmental site investigation of the lakefront study area in July and October 2004 and May 2005. Composite samples for PCB analyses were collected the 0- to 3-foot and 5- to 8-foot soil intervals from 47 locations to delineate the extent of PCB contamination in the dune area. The City's investigation report is provided in Appendix A, and the results are presented in Figure 3-11. PCBs were detected over most of the dune area at depths of up to 8 feet. Elevated concentrations of PCBs (greater than 1.0 mg/kg) were in the northern portion of the study area, especially east of the East Containment Cell. This area south of the North Ditch and east of the containment cell include three locations (S-34, S-25, and S-23) containing PCB concentrations greater than 100 mg/kg. The City's investigation results estimate that there is approximately 3,300 cubic yards of material with PCB concentrations greater than 10 mg/kg in this area.

In August 2005 the USEPA Emergency Response Branch collected additional soil samples from the dune area east of the main plant in response to the PCB concentrations in soils detected during the City of Waukegan's investigation. Sample locations were selected to coincide with locations sampled by the City of Waukegan or to provide better resolution of potential excavation areas. Samples collected by USEPA in August 2005 confirm the PCB concentrations detected by the City of Waukegan (Tetra Tech EM Inc. 2005). Samples collected by USEPA in August 2005 are presented on Figure 3-11.

3.3.2 Volatile Organic Compounds

Soil samples for VOC analysis were collected from beneath the building, the PCB area north of the plant, the grassy area south of the plant, the area west of the plant, and the former die cast UST area east of the plant. Soil samples were collected from 0 to 0.5 foot bgs and from the 2-foot interval above the water table. The primary VOCs detected include TCE, cis-1,2-DCE, 1,1-DCE, chloroethane, and vinyl chloride; however, lower concentrations of 1,1,1-TCA, 1,1-DCA, 1,2-DCA, trans-1,2-DCE, carbon tetrachloride, and PCE were detected (see Table 3-2). Total detected CVOC concentrations were used for data evaluation. Figures 3-12 and 3-13 present sample locations and analytical results for total CVOCs detected in soils collected from 0 to 0.5 foot bgs and greater than 0.5 foot bgs, respectively.

Based on the historic soils data and the oils used in the manufacturing operations, the distribution of BTEX compounds were thought to be indicative of site-related impacts. BTEX compounds were detected in only four of the surface soil samples (9 to 68 µg/kg) and five of the subsurface soil samples (4 to 2,550 µg/kg) collected across the site. The BTEX concentrations in soils are significantly lower in magnitude and less laterally extensive than CVOC concentrations. Figures 3-14 and 3-15 present sample locations and analytical results for BTEX contaminants in soils collected from the surface soil (0 to 0.5 foot bgs) and subsurface soil (depths ranging from 0.7 to 26.9 feet), respectively. BTEX is not discussed further below because of the relatively few samples with detections.

Beneath the Plant

Twenty two soil samples were collected from 11 sample locations beneath the OMC Plant 2 building and analyzed for VOCs (Figure 3-12). VOCs were detected in SO-069 (8 µg/kg) from 0 to 1.7 feet bgs. A sampling interval greater than 0 to 0.5 foot was necessary due to the thickness of backfill below the concrete building floor.

VOCs were detected in five samples collected beneath the building from depths ranging from 1.7 to 10.5 feet (Figure 3-13). Concentrations of total CVOCs detected range from 40 µg/kg (SO-069) to 1,302,150 µg/kg (SO-081). CVOC detections were limited to the eastern portion of the metal working area and west of the trim and triax buildings. The location of the highest CVOC concentrations in the subsurface soil samples correlated with three of the five MIP areas (Areas A, B, and C) beneath the building (Figure 3-8).

PCB Area North of the Plant

Seventy five soil samples were collected from 38 sample locations in the PCB area north of the building and analyzed for VOCs. CVOCs were detected in nine of the surface soil samples with total detected CVOC concentrations ranging from 2 µg/kg (SO-017) to 173 µg/kg (SO-020). The detections of CVOCs in the surface soil samples were found primarily along the exterior of the north building wall and the western portion of the former PCB AST area. The samples from these locations also contained PCBs (0.053 to 56.800 mg/kg). Unlike the distribution of PCBs, the distribution of CVOCs appears limited and does not extend to the northern access road, most of the northern parking lot area, or the open area north of the trim building.

CVOCs were detected in 12 of the subsurface soil samples collected from depths between 0.3 and 5.5 feet in the PCB area north of the plant. Total CVOC concentrations range from 3 µg/kg (SO-012) to 84,170 µg/kg (SO-062). The extent of CVOC detections in the subsurface soils is generally similar to that of CVOCs in the surface soil. The area with the highest concentration of CVOCS (SO-62 with 84,170 µg/kg) is consistent with the MIP Area B related to the chip wringer room. In addition, the low levels of detected CVOC concentrations at SO-20 (666 µg/kg), SO-026 (163 µg/kg), and SO-057 (12 µg/kg) are also consistent with the conclusion relative to MIP Area C that the bulk of CVOC contamination in this area is deeper.

Grassy Area South of the Plant

Sixteen samples (12 unsaturated and 4 saturated soil samples) for VOC analysis were collected from five soil samples and two geotechnical borings in the grassy area south of the plant and analyzed for VOCs. CVOCs were only detected in two of the five surface soil samples SO-050 (38 µg/kg) and SO-052 (32 µg/kg).

CVOCs were detected in six subsurface soil samples collected from depths ranging from 0.6 to 3.8 feet in the grassy area south of the plant. CVOC concentrations range from 7 µg/kg (SO-054) to 775 µg/kg (SO-074).

Area West of the Plant

Four samples from two sample locations were collected in the onsite area west of the plant. The area is a narrow strip of land between the western plant wall and the western property fence used primarily for storage and for access to western portions of the property. This area is currently used for boat and trailer storage. Investigation activities in this area were restricted due to the North Shore Sanitary District high-pressure force main running south to north beneath the western property fence.

CVOCs were not detected in surface soil samples but were detected in the subsurface soil in SO-046 at 12 µg/kg from 1.2 to 2.2 feet bgs. The limited extent of the CVOC contamination and the low concentrations indicate the CVOCs at SO-046 are not part of a previously identified source area.

Former Die Cast UST Area East of the Plant

Eighteen soil samples were collected from nine sample locations in the former die cast UST area east of the plant and analyzed for VOCs. CVOCs were not detected in the surface or subsurface soil samples collected from the former die cast UST area east of the plant.

3.3.3 Carcinogenic Polynuclear Aromatic Hydrocarbons

Soil samples for SVOC analysis were collected from the PCB area north of the plant, the grassy area south of the plant, the area west of the plant, and the former die cast UST area east of the plant. Of the SVOCs, CPAHs were the focus of the investigation based on analytical results from previous investigation activities performed at the site and OMC's manufacturing operations. CPAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. Figures 3-16 and 3-17 present sample locations and the total CPAH concentration detected in the surface soil (0 to 0.5 foot bgs) and from the interval above the water table and saturated soil samples (i.e., greater than 0.5 foot bgs), respectively.

Beneath the Plant

Soil samples from six sample locations were collected from beneath the plant for analysis of SVOCs. The analytical results indicate the occurrence of CPAHs in soils beneath the building is limited and at low concentrations. Total CPAH concentrations in the soils from depths between 3.3 and 6.5 feet ranged from 72 to 1,100 μg/kg, with the highest concentration from the chip wringer room (SO-081).

PCB Area North of the Plant

Seventy three soil samples were collected from 36 sample locations in the PCB area north of the plant and submitted for SVOC analysis. CPAHs were detected in 22 samples collected from 0 to 0.5 foot bgs at concentrations ranging from 36 μg/kg (SO-026) to 174,000 μg/kg (SO-032). Although the samples containing CPAH also contained PCBs, there was not a correlation relative to the magnitude of the concentrations. The sample with the second highest concentration of CPAHs was from SO-003 (103,900 μg/kg), which contained only 200 μg/kg of PCBs. It should be noted that the majority of this area is currently paved with asphalt that may be contributing to the elevated CPAH concentrations detected in the shallow soil.

CPAHs were detected in 22 samples collected from depths between 0.3 and 3.3 feet in the PCB area north of the plant at concentrations ranging from 44 μg/kg (SO-013) to 54,600 μg/kg (SO-015). The distribution of the CPAH detections in the subsurface soils were limited to the area between the building and the West Containment Cell and retention pond and the open area north of the trim building (Figure 3-17).

Grassy Area South of the Plant

Sixteen samples (12 unsaturated and 4 saturated soil samples) for VOC analysis were collected from five soil samples and two geotechnical borings in the grassy area south of the plant (Figures 3-16 and 3-17). CPAHs were detected in the six surface samples at concentrations ranging from 1,586 μg/kg (SO-053) to 73,200 μg/kg (SO-074). SO-074 was collected from 0.4 to 0.8 feet bgs to allow sample collection below asphalt pavement. CPAH concentrations in the surface soil generally decrease to the south, away from the plant.

The extent and magnitude of the CPAH concentrations decrease with depth. CPAHs were detected in four of the subsurface soil samples collected from depths between 1 and 3.8 feet at concentrations ranging from 171 μg/kg (SO-053) to 465 μg/kg (SO-050).

Area West of the Plant

Three samples were collected from one location (SO-064) north of the former hazardous waste storage building, west of the main plant. CPAHs were detected in the two shallow samples at concentrations of 40,000 μg/kg (0 to 1.0 foot) and 30,500 μg/kg (4 to 4.6 feet). A black, oily substance was observed on the soil sample. This black, oily material may be related to operations at a manufactured gas plant historically located northwest of the site. Detections of CPAHs at this location appear to be limited in extent. Visual evidence and the presence of CPAHs were not detected at SO-046 or SO-065.

Former Die Cast UST Area East of the Plant

Eighteen samples were collected from nine sample locations in the former die cast UST area east of the plant. CPAHs were detected in nine surface soil samples at concentrations ranging from 716 μg/kg (SO-043) to 302,000 μg/kg (SO-035). The highest concentrations of CPAHs in the area are found in the parking area at the southeast corner of the building, just north of the WCP site.

The distribution and magnitude of the CPAH concentration in this area showed less of an impact with depth. CPAHs were detected at five of the nine subsurface sample locations at depths ranging from 0.6 to 2 feet. The detected CPAH concentrations ranged from 40 μg/kg (SO-038) to 9,660 μg/kg (SO-035). CPAHs were not detected in samples north of the former die cast UST area that contained the highest PCB concentrations, indicating that the presence of CPAHs are likely impacts related to the former USTs.

As part of the City of Waukegan' s investigation of the lakefront study area, composite samples for SVOC analyses were collected from the 0- to 3-foot and 5- to 8-foot soil intervals from 14 locations in the dune area. According to its report, no SVOCs were detected above the Tier 1 soil remediation objectives for residential properties (Deigan 2004; see Appendix A).

3.3.4 Metals

Metal constituents were detected in the one soil sample analyzed for metals as indicated on Table 3-2. None of the detected soil concentrations exceed the TACO Tier 1 values for direct contact for residential properties.

In addition, as part of the City of Waukegan's investigation of the lakefront study area, composite samples for metals analyses were collected from the 0- to 3-foot and 5- to 8-foot soil intervals from 14 locations in the dune area. According to its report, the metals were within the accepted IEPA background range for metropolitan areas (Deigan 2004; see Appendix A).

3.4 Groundwater

The overall RI objective for groundwater sampling is to define the nature and extent of contamination, to support the assessment of potential risk to human health and the environment, to determine whether remedial actions are necessary, and if so, to allow evaluation of remedial alternatives. The nature and extent of groundwater contamination has been relatively well defined based on data from previous investigations.

A focused RI field investigation was conducted to:

- Verify current groundwater quality conditions indicated by existing data
- Define the extent of contamination to the south, around "hot spot" areas, and beneath portions of the plant that have no data
- Define the extent of NAPL
- Collect field measurements and natural attenuation parameters to determine remedial options and hydrogeologic conditions at the site

3.4.1 Groundwater Sampling

Groundwater sampling using low-flow methods was performed as part of the groundwater investigation at the Plant 2 site between April 25 and May 6, 2005. The sampling was conducted in accordance with procedures presented in USEPA publication, *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers (2002)*. A description of the locations and the procedures are summarized in the *Hydrogeologic Investigation* technical memorandum provided in Appendix B. The analytical result tables for groundwater samples are presented in Appendix C. The locations of new and existing groundwater monitoring wells are presented in Figure 3-18.

Based on previous investigations conducted by OMC and USEPA, the hydrogeologic investigation focused on two zones within the aquifer. The shallow groundwater zone includes the water table surface and includes 27 wells installed to depths up to 15 feet. The deep groundwater zone is monitored by 32 wells that are installed above the till surface at depths up to approximately 30 feet. Results of the investigation are discussed below using reference to shallow and deep groundwater zones.

Table 3-3 presents the frequency of detection of individual compounds in groundwater samples. Data are presented for the most frequently detected compounds by grouping into the following categories: PCBs, VOCs, CPAHs, and select metals. The TACO Tier 1 groundwater remediation objectives for Class 1 aquifers have also been provided for comparison purposes. Review of the frequency of detections and the compounds that exceed the Tier 1 groundwater objectives indicates that the major site-related impact to groundwater is the high concentration of CVOCs. The presence of elevated iron and manganese, and possibly arsenic, may be attributed to the reducing conditions that exist beneath the site.

PCBs

PCBs were detected in shallow groundwater at MW-501S, MW-512S, and MW-517S (Figure 3-19). The concentrations of PCBs detected in the shallow groundwater zone ranges from 0.19 μg/L (MW-512S) south of the triax building to 157 μg/L (MW-517S) adjacent to the former hazardous waste storage building. The third sample with detectable levels of PCBs was from MW-501S near the northeast corner of the East Containment Cell/property boundary. Specific PCB compounds detected in shallow groundwater were PCB Arochlors 1016 and 1248. The presence of PCBs in MW-512S and MW-501S that are screened across the water table are consistent with high concentrations of PCBs in the shallow soil in these areas (1.862 mg/kg from 2.1 to 2.4 feet in SO-074 and 14,000. mg/kg in S-34, respectively). The source of PCBs in MW-517S is not known, but observations during drilling at this location indicated a solvent-like odor.

In deep groundwater zone, PCBs were detected in 5 of the 32 well locations (see Figure 3-20) and are primarily confined to the old die cast area (MW-505D, MW-510D, MW-517D) and in the vicinity of the containment cells (W-3 and W-10). PCBs detected ranged in concentrations from 0.18 μg/L (MW-510D) beneath the plant to 230 μg/L outside the building near the former hazardous materials storage area (MW-517D). PCB compounds detected in deep groundwater were PCB Arochlors 1016, 1232, 1248, and 1254. PCBs were not detected in the shallow monitoring wells MW-505S and MW-510S.

VOCs

The CVOCs were the most frequent type of VOC detected in groundwater and were generally found at concentrations exceeding Tier 1 Groundwater Remediation Objectives (Table 3-3). Benzene was also frequently detected (in 45 of 93 samples), and is summed with detections of ethylbenzene, toluene, and xylene to depict total BTEX concentrations across the site. Total CVOC and total BTEX concentrations are shown on Figures 3-21 through 3-24 for shallow and deep groundwater zones.

Total CVOCs. Total CVOCs detected in shallow groundwater ranged from 0.06 μg/L (W-13) along the eastern property boundary to 64,810 μg/L (MW-503S) outside the building near the chip wringer. The distribution and magnitude of the CVOC detections are generally consistent with the primary areas of VOCs identified by the MIP investigation. The elevated CVOC concentrations detected in MW-504S (7,753.2 μg/L) and MW-503S (64,810 μg/L) verify the MIP results for Area B (near the chip wringer) and Area C (eastern metal working area), respectively. The additional area of elevated total CVOCs in shallow groundwater extending southwest of the triax building toward Larsen Marine Service property (MW-512S, MW-514S, and MW-11S) also correlated with Area A identified by the MIP investigation.

The two areas beneath the parts storage area (Areas D and E on Figure 3-8) were not confirmed by the groundwater samples collected from MW-505S and MW-510S. The maximum response was recorded for at least one of the detectors at MIP locations (MIP-014 and MIP-043), and the corresponding monitoring wells (MW-505S and MW-510S, respectively) contained relatively low concentrations of CVOCs (9.3 and 18.97 μg/L, respectively). Total CVOC concentrations of 84.5 and 32.3 μg/L were also detected in two of the wells along the southern margin of the North Ditch (MW-500S and MW-501S).

The distribution of the CVOCs detected in the deep groundwater is similar to that identified in the shallow zone. Comparison of the magnitude of the concentrations between the samples from the shallow and deep wells indicates the CVOC concentrations generally increase with depth. The location with highest CVOC concentration in the deep groundwater (263,450 µg/L in MW-503D) did not contain concentrations of CVOCs at the same order of magnitude in the shallow zone (64,810 µg/L in MW-503S). The majority of the total CVOCs detected in MW-503D consists of cis-1,2-DCE and vinyl chloride (250,000 and 12,000 µg/L, respectively).

In addition, the total CVOC concentrations beneath the building increased from 26.31 µg/L in MW-506S to 105,380 µg/L in MW-506D. The exception to increases with depth was at location MW-504 where the total CVOC concentration is greater in the shallow zone compared with the deep zone (7,753.2 µg/L compared with 2,043.7 µg/L). The sample from MW-504S contains TCE (420 µg/L) in addition to higher concentrations of the cis-1,2-DCE (6,200 µg/L) and vinyl chloride (1,100 µg/L).

Total BTEX. Total BTEX concentrations in both shallow and deep groundwater zones correlate to the areas of elevated CVOCs but are orders of magnitude lower than chlorinated concentrations (Figures 3-23 and 3-24). BTEX concentrations detected in shallow groundwater ranged from 0.03J µg/L at MW-3S to 51 µg/L at MW-503S. MW-503S is situated near the chip wringer.

Detected total BTEX concentrations in deep groundwater ranged from 0.04 µg/L (W-11 and W-10) to 485 µg/L (MW-516D). These deep BTEX concentrations are generally detected at higher concentrations than those for the shallow groundwater.

CPAHs

CPAHs were not detected in any of the groundwater samples collected. Due to the hydrophobic nature of CPAH compounds, it is unlikely CPAH compounds would be detected in groundwater samples under current conditions.

Metals

Based on the manufacturing operations, frequency of detection, and the comparison with the Tier 1 Groundwater Remediation Goals (see Table 3-3), the metal compounds that indicate site-related impacts include arsenic, chromium, mercury, and total cyanide. Elevated concentrations of arsenic (greater than 50 µg/L) were generally not detected beneath the OMC Plant 2 building. The elevated concentration of arsenic detected in shallow groundwater was located downgradient of OMC Plant 2, beneath the eastern portion of the property (W-13, MW-100, MW-101, MW-102, MW-3S, and MW-14S). The highest arsenic concentration (357 µg/L) was found in MW-101. Arsenic in the deep groundwater was detected across the site, with the highest concentrations at locations south of the site in wells MW-515D, MW-3D, MW-14D, and MW-516D, possibly associated with former WCP operations. Arsenic was also detected at elevated concentrations in the deep groundwater in the northeast corner of the site along boundary of the North Ditch (MW-501D).

Similarly, chromium was detected in the shallow and deep groundwater, generally near the eastern and southern property boundaries, with the exception of W-6 – a deep well with an estimated chromium detection of 1.9 µg/L. The highest concentration detected was at MW-516D (9.4 µg/L). None of the chromium values exceeded the Tier 1 criteria.

Total cyanide was detected in both shallow and deep groundwater, mainly upgradient and downgradient of OMC Plant 2. The highest concentration of cyanide in the shallow zone was downgradient at MW-3S (99.2 µg/L), followed by upgradient at MW-502S (23.5 µg/L). MW-3S is located on the former WCP site. Total cyanide was detected at significantly higher concentrations in deep zone than in shallow zone groundwater. The highest concentrations detected in deep groundwater were at MW-516D (1,020 µg/L) and MW-515D (264 µg/L). The areas of high total cyanide concentrations are associated with areas surrounding the West Containment Cell and areas south of the site (Larsen Marine Service property and the former WCP).

3.4.2 Nonaqueous Phase Liquid Extent

Previous investigations have indicated the likely presence of NAPL onsite from observed groundwater concentrations. As part of the MIP investigation, DNAPL was suspected (based on MIP detection levels) in the courtyard north of the trim building just east of the old die cast area at MIP-027. Following this discovery, shallow soil borings SO-026 and SO-057 were completed at this location with no evidence of NAPL from soil samples collected. Groundwater grab samples collected at SO-057 (at the MIP-027 location) encountered a dark brown/black oily DNAPL at the base of the aquifer from 26.5 to 30.5 feet bgs. The DNAPL was collected and analyzed, and the analytical results indicate that the DNAPL is comprised of 1,600 g/kg TCE.

In an effort to visually determine the extent of the DNAPL, four additional borings (SO-057N, SO-057S, SO-057E, and SO-057W) were installed 50 feet north, south, east, and west of the SO-057/MIP-027 location. The discreet groundwater sampler was advanced to a target depth of 30.5 feet bgs, the screen was opened, and approximately 2 gallons of water were purged. During purging, no DNAPL or indications of DNAPL (sheen, strong odors, high PID readings) were observed from any of the offset borings, indicating the likelihood of DNAPL extent to be less than 50 feet from SO-057.

3.4.3 Natural Attenuation Data

Monitoring and documentation of natural attenuation processes is known as monitored natural attenuation (MNA), which can achieve remediation objectives by reducing the mass, toxicity, mobility, volume, or concentration of contaminants within a time frame that is reasonable compared to that offered by other, more active methods (USEPA 1999). Ongoing Natural attenuation can involve a number of interactive processes that may include dilution, adsorption, advection, and dispersion; volatilization; geochemical dynamics; and chemical or biological transformation (microbial attenuation).

Natural attenuation will occur to some degree at any site, and the natural attenuation process helps to govern the nature and distribution of the contaminants in the subsurface environment. The magnitude of each individual natural attenuation process is governed by the prevailing site conditions and by the nature of the compound under study.

Based upon groundwater monitoring data for the shallow and deep unconsolidated zones performed in April and May 2005, chlorinated "parent" products in groundwater (TCE and

1,1,1-TCA) are being degraded by anaerobic reductive dehalogenation and other natural attenuation processes to transformation products (1,2-DCE, vinyl chloride, 1,1-DCA, 1,1-DCE, and chloroethane). The extents of the parent and daughter compounds in the shallow and deep groundwater are presented on Figure 3-25 through Figure 3-30.

Final and nontoxic degradation byproducts, ethene and ethane, were detected at the site in April and May 2005. The detection of ethene and ethane at relatively high concentrations coincident with the high CVOC areas, and lower concentrations downgradient, indicates that microorganisms currently present in the subsurface have the capacity to degrade parent products through each step of the dechlorination process. Based on data collected to date, the presence of ethene/ethane in groundwater provides evidence that CVOCs are being dechlorinated to environmentally acceptable end products.

Results of field measurements of dissolved oxygen (DO) and oxidation reduction potential (ORP) also support the occurrence of reductive dehalogenation in the area of CVOC detection. DO and ORP were measured during well purging to assess the redox conditions in the groundwater. These data suggest that anaerobic conditions exist widely across the site. DO is below 1 milligram per liter (mg/L) in wells across the site, and ORP is at values less than 50 millivolts (mV) coincident with most areas of higher CVOC concentration, suggesting that anaerobic conditions persist across the site. As groundwater travels beneath OMC Plant 2, it appears to become more anaerobic from ongoing degradation processes.

Nitrate concentrations were generally observed as less than 1 mg/L across the site, allowing for favorable conditions of natural attenuation. The decreased sulfate values in areas of highest CVOC detections also provide evidence of active reductive dechlorination.

In general, dissolved iron, dissolved manganese, and methane were detected above background concentrations, coincident with the highest CVOC concentrations near the chip wringer and areas south and west of the chip wringer (W-9, W-10, and well nests MW-502 through MW-506). Ethane and ethene were detected within these same zones at the highest concentrations. Ethene was not detected downgradient in the shallow portion of the aquifer, but was detected downgradient in the deep portion of the aquifer. Ethene and methane have been detected at the highest concentrations in samples collected from shallow zone well nests MW-502 through MW-506 and MW-510, indicating that methanogenic conditions exist beneath the northern portion of Plant 2, coincident with MW-503S.

In the deeper portion of the aquifer, higher concentrations of methane are present beneath the southern portion of Plant 2 (beneath the corporate building and parking lot areas) but are detected in all wells sampled. Methane is produced by the metabolism of a wide range of organic substrates by methanogenic bacteria. This group of bacteria is known to play a role in CVOC attenuation. Data collected from other portions of the study area suggest that natural attenuation is occurring, but at a much reduced rate when compared to the areas associated with the chip wringer and south and west of the chip wringer.

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3.5 Soil Gas and Indoor Air

Soil gas and indoor air sampling investigations were conducted on February 23, 2005, to determine if volatilization from the groundwater plume may cause a potential inhalation risk to human health. A focused investigation was conducted to:

- Characterize the CVOC levels in the soil gas above the chlorinated solvent plume south of the OMC site.
- Determine CVOC concentrations in ambient air within the buildings currently utilized by Larsen Marine Service that may be impacted by volatilization from the groundwater plume.

The sampling procedures are discussed in the *Indoor Air and Soil Gas Sampling* technical memorandum provided in Appendix B. Analytical results for the air and soil gas samples are provided in Appendix C.

3.5.1 Soil Gas Sampling

Five soil gas samples were collected from the unsaturated zone at locations south of the OMC site in the vicinity of Larsen Marine Service (OMC-GS001 through OMC-GS005) and are shown on Figure 3-31. The locations were selected based on the results from previous investigations and from the MIP investigation to provide spatial coverage across the groundwater plume beneath the Larsen Marine Service property.

Twelve VOCs were detected in the soil gas samples. CVOC, BTEX, chloromethane, dimethylbenzene, and MEK were the primary constituents detected in soil gas samples. The highest concentrations of VOCs detected (total of 85.2 parts per billion by volume [ppbv]) were from location GS-005, farthest south on the Larsen Marine Service property, just southeast of the "I/O" Building. Acetone (49 ppbv) comprised more than half of total VOCs detected at this location. Soil gas sample GS-003 had elevated detection limits due to the highest observed concentrations of benzene (8.8 ppbv) and MEK (11 ppbv) at this location. PCE and TCE were detected at GS-001, GS-004, and GS-005.

Other CVOCs detected included cis-1,1-DCE at GS-001 and GS-002, and 1,1,1-TCA at GS-004 and GS-005. PCE, 1,1,1-TCA, dimethylbenzene, chlorormethane, and ethylbenzene were not detected in any of the groundwater samples, MEK was detected in only one well (MW-14D), and acetone was detected in three of the deep groundwater samples. Although some of the detected compound in the soil gas samples are considered to be site-related (e.g., TCE and cis-1,2-DCE), the concentrations of these compounds and the predominance of additional compounds not detected in the groundwater samples indicates that the groundwater plume is not the major source of the VOCs detected in the soil gas samples.

3.5.2 Indoor Air Sampling

In addition to the soil gas samples, indoor air samples were collected from the Larsen Marine Service buildings. Over an 8-hour period, four samples from within main buildings on the Larsen Marine Service property (AA-001 through AA-004) and one background sample (AA-005) were collected using Summa canisters and analyzed for VOCs (Figure 3-31).

The FSP proposed to collect samples from within each of the main buildings on the Larsen Marine Service property. Prior to sampling, a reconnaissance of the buildings was conducted to identify the buildings with VOC-generating activities such as painting or degreasing, and to note where visible defects in the floor where soil gas intrusion could occur. Based on the site reconnaissance, the "I/O" Building and Building "H" were selected because visible defects were observed in the floor, and there were no odors or evidence of recent activities that could potentially compromise the indoor air quality. The sample locations (Figure 3-31) included:

- Three samples from locations in the "I/O" Building
- One sample from Building "H"
- One background sample was located outdoors about 75 feet southwest of Building C, which was upwind of the study area at the start of the sampling

In general, similar compounds were detected in the indoor air investigation as were found in the soil gas investigation results. The highest total VOCs detected (61.2 ppbv) was at AA-001 in the "I/O" Building located near a crack in the cement floor. This location also had the highest concentrations of PCE and methylbenzene detected. PCE was detected in samples AA-001 through AA-003 collected from the "I/O" Building. PCE concentrations in the indoor air samples were an order of magnitude higher than detected in the soil gas.

Methyl benzene results were also generally higher in the indoor air samples than the soil gas, indicating that the source of PCE and methylbenzene may not be related to soil gas migration. Sample AA-004 from Building "H" had a considerably lower concentration of total VOCs (10.83 ppbv) than those detected at the "I/O" Building. This location had the only detection of methyl n-butyl ketone on the Larsen Marine Service property. The background air sample showed detections for benzene and methylbenzene at very low concentrations (0.23 and 0.38 ppbv, respectively).

Conclusion

Many of the same compounds were detected in the soil gas and indoor air samples. However, the main site-related VOCs (e.g., TCE and cis-1,2-DCE were detected near detection limits in the soil gas and not detected in the indoor air samples. Also, the predominance of compounds not detected in the groundwater samples at OMC indicates that the presence of VOCs in the buildings may not be related to volatilization from the groundwater plume.

3.6 Summary of Findings

The findings of the field investigation relative to the nature and extent of contamination at the OMC Plant 2 included the following:

- Results from the porous and nonporous wipe samples indicate that the building materials contain concentrations of PCBs exceeding the 10 $\mu g/cm^2$ TSCA disposal criteria, with the highest PCB concentrations in the old die cast and parts storage areas. Concrete core samples from the floor and paint chip and concrete samples from these areas indicate the presence of PCBs at concentrations exceeding the 50 mg/kg TSCA disposal criteria. Analytical results indicate that metals and PCBs will not leach out of the concrete floor samples at concentrations exceeding the TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.
- The manholes west of the corporate building to the triax building were found to contain varying amounts of standing water and large volumes of sediment. The plugging of the storm sewer pipe appears to be effectively preventing discharge directly to Waukegan Harbor. PCB concentrations exceeding 1 mg/kg were detected in samples from five of the seven storm sewer locations. The highest concentrations were found south of the triax building and just north of East Seahorse Drive.
- Concentrations of PCBs and CPAHs that exceed the TACO Tier 1 soil remediation objectives for residential properties (based on a direct contact pathway of exposure) were found in shallow soil. Elevated PCB concentrations exceeding 1.0 mg/kg were detected across the site and in the dune area east of the plant. The majority of PCB concentrations in the soil beneath the plant were consistent with where the wipe and concrete core samples indicated the presence of PCBs. The results indicate that the majority of the most contaminated soils were removed as part of OMC's remediation north of the building. The additional areas containing PCB- and/or CPAH-contaminated soil include north of the plant in the vicinity of former loading docks and tank areas, and in the open area north of the trim building, the former die cast UST/AST area, and the dune area east of the plant. Elevated concentrations of CPAHs were also found in the area surrounding the corporate building.
- DNAPL was encountered during the MIP investigation at one location and was comprised of 1,600 g/kg of TCE. The extent of the DNAPL was investigated and not found 50 feet around the MIP-027/SO-057 location. Concentrations of TCE indicative of residual DNAPL were detected in a saturated soil sample collected from SO-081 in the area of the chip wringer.
- Groundwater contamination is mainly related to the use of chlorinated solvents, primarily TCE, in manufacturing operations at OMC Plant 2. The MIP, soil, and groundwater investigations indicate that the distribution of CVOCs is limited in extent and appears as isolated areas rather than a single plume. The MIP investigation identified five areas of which three (Areas A, B, and C) were confirmed by the soil and groundwater results. The CVOC plume extending south of the building does not appear to have migrated far offsite and does not extend to Waukegan Harbor. The components of the CVOC concentrations include TCE, cis-1,2-DCE, and vinyl chloride. The presence

of TCE degradation compounds and results of natural attenuation parameters indicate that the TCE area is being degraded by anaerobic reductive dechlorination.

- The relative concentrations of site-related compounds (e.g., TCE and cis-1,2-DCE) and the predominance of compounds not detected in the groundwater samples indicate that volatilization from groundwater is probably not the major source of the VOCs detected in the soil gas samples or the indoor air samples from the Larsen Marine Service buildings.

SECTION 4

Fate and Transport

This section addresses the release of site-related contaminants and their subsequent transport and fate in the environment. The environmental transport and fate of contaminants is dependent on the physical and chemical properties of the compounds, the biological and chemical processes affecting them, and the media through which they are migrating. Specifically, this section describes:

- Physical, chemical, and migration properties of representative compounds
- Potential migration pathways
- Migration and fate of representative compounds

Because natural attenuation will be evaluated as a potential remedial approach for addressing VOCs in groundwater, Section 4.5 presents an evaluation of natural attenuation process occurring at the site.

4.1 Site-Related Contaminants

As described in Section 3, site-related impacts are represented by three main categories of chemicals present within the different media at OMC Plant 2: PCBs, CVOCs, and CPAHs. Table 4-1 presents the representative chemicals from these categories that were selected based on concentration, frequency of occurrence, migration potential, toxicity, and carcinogenic potential to examine the fate and transport mechanisms operating at the site.

4.2 Physical and Chemical Properties

The mobility and persistence of site-related chemicals are determined by their physical and chemical interaction with the environment. Mobility is the measure of a chemical's movement from the source areas. The important properties of the contaminant relative to mobility include molecular weight, water solubility, specific gravity, vapor pressure, Henry's law constant, and partitioning coefficients. The definitions of these properties and typical values for the site-related chemicals are provided in Tables 4-2 and 4-3, respectively. Persistence is the measure of how long a chemical will remain in the environment. The evaluation of persistence of a chemical in the environment is based primarily on the hydrolysis, biodegradation and photolysis half-lives. Table 4-4 presents typical values relative to persistence. Environmental factors that affect the behavior of a chemical include pH, concentration of other ions in the medium, soil moisture, oxidation-reduction potential, water chemistry, organic content, and presence of macro- and microorganisms.

The categories of organic compounds are discussed separately below on the basis of behavior. It should be noted that the discussions of the fate of individual organic chemicals in the environment typically assume that these chemicals are not present as a separate phase. The presence of NAPLs at OMC Plant 2 has implications on the mobility and persistence of individual chemicals. For example, low solubility organic chemicals may migrate with NAPL, or the NAPL may limit the potential for biodegradation as reported in the literature.

4.2.1 Polychlorinated Biphenyls

PCBs are a class of chlorinated chemical compounds in which 2 to 10 chlorine atoms are attached to the biphenyl molecule (two connected benzene rings). There are 209 related substances (congeners) that are classified as PCBs. Mixtures of PCB congeners were sold under the trade name Aroclor. The Aroclors are identified by a four-digit numbering code in which the first two digits indicate the type of mixture (the number of carbons in the structure) and the last two the approximate chlorine content by weight percent. Table 4-5 presents chemical and physical properties of some of the Aroclors. The Aroclors detected at the OMC site include Arochlor 1016, 1232, 1242, 1248, 1254, and 1260; with Aroclor 1248 being the most frequently detected in soil and groundwater.

The chemical, physical and biological properties of PCBs depend to a large degree on the amount and location of the chlorine atoms on the two benzene rings of each specific PCB and on the particular mixture of individual chlorobiphenyls that comprise the mixture. In general, the more chlorine present in a PCB, the longer it will take to degrade and the more potential harm it may cause to organisms.

Mobility and Partitioning

PCBs have low vapor pressures, low water solubility, and high partitioning coefficients (K_{ow}). PCBs are relatively insoluble in water, and the solubility decreases with increased chlorination. PCBs are freely soluble in polar organic solvents and biological lipids. Aroclor mixtures with between 40 and 60 percent chlorine have reported solubility in water of 0.06 to 0.34 mg/L (Table 4-5).

PCBs in soil are unlikely to leach to groundwater because of low water solubility and strong binding potential to soil. PCBs will leave the water column by partitioning onto solids (soil, sediments and suspended particulates), and by volatilization at the air/water interface. Once bound, the PCBs can be immobilized for relatively long periods with slow desorption providing continuous low-level exposure to the surrounding locality. The adsorption of PCBs onto solids is greatest for solids composed primarily of organic matter and clay. The more highly chlorinated PCBs are less soluble in water, have higher distribution coefficients (K_ds) and a greater tendency to bind to solids as a result of strong hydrophobic interactions. In contrast the low molecular weight PCBs, which have a higher water solubility and lower K_ds, sorb to a lesser extent on solids and are more likely to remain in the water or to volatilize (see Table 4-5). PCBs also leave the water column by concentrating in biota.

PCBs may be transported from soil and sediment to the atmosphere. PCBs with vapor pressures greater than 10^{-4} mm mercury appear to exist in the atmosphere almost entirely in the vapor phase, while PCBs with vapor pressures between 10^{-7} and 10^{-4} mg mercury exist in both the adsorbed and vapor phase. Volatilization from soil appears to be an important loss mechanism; it is more important for lower chlorinated congeners than for higher chlorinated congeners because the lower chlorinated congeners have greater vapor pressures. The importance of volatilization to the atmosphere is supported by the estimated Henry's law constant for PCBs, which range from 2.9×10^{-4} to 4.6×10^{-3} atm-m^3/mol and 1.5×10^{-5} to 2.8×10^{-4} atm-m^3/mol, respectively (ATSDR 2000). In addition to volatilization from soil, volatilization of PCBs from the contaminated building materials may also be a transport mechanism occurring within the OMC Plant 2 building.

Persistence and Degradation

The persistence and ability of PCBs to be degraded or transformed in the environment depends on the number of chlorine atoms attached to the biphenyl molecule and where they are attached (Mackay et al. 1992). PCBs with fewer chlorine atoms are more soluble, more amenable to chemical and biological degradation, and less persistent in the environment than those PCBs with more chlorine atoms.

The vapor-phase reaction of PCBs with hydroxyl radicals is the dominant transformation process in the atmosphere. In water, abiotic transformation processes such as hydrolysis and oxidation do not significantly degrade PCBs. Photolysis appears to be the only significant chemical degradation process in water. Photolysis of PCBs occurs by photolytic cleavage of a carbon-chlorine bond followed by a stepwise replacement of chlorine with hydrogen which degrades PCBs. In all cases, the ring with the greatest degree of chlorination is the primary ring where dechlorination occurs. Photolysis of PCBs from surface soil may occur and PCBs may also undergo base-catalyzed dechlorination, but neither process is likely to be significant removal mechanisms. There is no known abiotic process that significantly degrades PCBs in soil and sediment (ATSDR 2000).

The rate of PCB biodegradation in water also depends on both individual congener structure and environmental conditions. PCBs, particularly highly chlorinated congeners, adsorb strongly to sediment and soil where they tend to persist with half-lives on the order of months to years. Biodegradation in the environment, although slow, occurs under both aerobic and anaerobic conditions and is the major degradation process for PCBs in soil.

Aerobic biodegradation in soil, surface water, and sediments is limited to the less chlorinated congeners. Biodegradation of PCBs in aerobic soil is slow, especially in soils that have high organic carbon content. PCBs that remain firmly bound in soil and sediment may not be bioavailable to the degrading organisms at sufficient concentrations.

PCB congeners with three or fewer chlorine substituents (major components in Aroclors 1221 and 1232) are considered to be nonpersistent, whereas those with five or more chlorines (major components in Aroclors 1248, 1254, and 1260) are not readily degraded and are considered to be persistent. Tetrachlorobiphenyls (major components in Aroclors 1016 and 1242) are intermediate in persistence. Thus, the addition of a PCB mixture to an aerobic environment results in a fractionating effect, whereby less chlorinated species biodegrade first and leave behind, for long-term buildup, the more highly chlorinated species (ATSDR 2000).

In sediments, anaerobic microbial degradation will be primarily responsible for transformation, particularly of the more highly chlorinated congeners. PCBs biodegrade slowly in anaerobic environments through reductive dechlorination, resulting in the formation of less toxic mono- and dichlorobiphenyl congeners that are aerobically biodegradable. For reductive dechlorination to occur, a low redox potential similar to methanogenesis and the absence of oxygen are thought to be required, although some studies have shown that sulfidogenic redux conditions may also allow reductive dechlorination to proceed but at a comparatively slower rate. Optimal rates of PCB dechlorination usually occur in the concentration range of 100 to 1,000 ppm (wet weight). Below a certain threshold concentration (less than 50 ppm), the rate of dechlorination is often very slow or nonquantifiable. PCBs generally remain tightly bound in soil and sediment, and may not be bioavailable to the biodegrading organisms even at optimum concentration. Some studies report that dechlorination was shown under denitrifying and iron (III) reducing conditions as well. Rates of dechlorination are fastest in methanogenic (the most reducing) environments (ATSDR 2000).

Temperature is also an important factor controlling the rate of microbial dechlorination. Temperatures in the range of 12 to 25°C support dechlorination, whereas dechlorination was not observed at temperatures greater than 37°C.

Biodegradation of PCBs in aerobic or anaerobic groundwater has not been studied, although PCBs have been reported in groundwater environments. In aerobic groundwater, less-chlorinated PCB congeners, which would be more likely to leach, would presumably biodegrade based on studies in aerobic surface waters and soil. However, groundwater is also commonly anaerobic, and microbial degradation under low oxygen condition proceeds for even the more highly chlorinated congeners (ATSDR 2000).

4.2.2 Chlorinated Volatile Organic Compounds

Groundwater contamination at OMC Plant 2 is related mainly to the use of chlorinated solvents, primarily TCE, in manufacturing operations. TCE was used for vapor degreasing of metals that resulted in releases to the environment through evaporation, spills, and leaks from storage tanks and pits. The other major components of the CVOC plume include cis-1,2-DCE and vinyl chloride, the typical reductive dechlorination products of TCE. Because TCE, cis-1,2-DCE, and vinyl chloride are expected to control health risk relative to the groundwater plume and they have different properties, they are discussed separately below.

Trichloroethene (TCE)

Mobility and Partitioning. TCE has a relatively low water solubility and reasonably high vapor pressure. When released to soil, it volatilizes rapidly near the surface. The TCE that does not volatilize is mobile within available pore space. Because TCE has a specific gravity greater than that of water, its pure phase can displace soil pore water and move downward. The downward movement of the pure phase would continue until a low permeability unit is reached or the amount of pure phase present is not enough to overcome pore pressures for further downward movement.

Measurable TCE pure phase or DNAPL was encountered in the courtyard north of the trim building just east of the die cast area (at MIP-027/SO-057 location). Additional areas of DNAPL may exist beneath the metal working area (groundwater grab sample GW-048), near the chip wringer room (saturated soil sample SO-081), and west of the trim building (saturated soil sample SO-070) where the detected TCE concentrations (16 mg/L, 1,300 mg/kg, and 28 mg/kg, respectively) are greater than 1 percent of the solubility limit (Russell et al., 1992).

Sorption of TCE to organic compounds in soil depends on the organic carbon content of the soil. The soil organic carbon/water partitioning coefficient (K_{oc}) value of 166 milliliters per gram (mL/g) indicates that TCE has medium to high mobility through soils and will not partition significantly from water to soil. The relatively low K_{ow} value of 2.4 indicates that TCE tends to move in an aqueous phase and will not tend to bioaccumulate in the lipid tissues.

The Henry's law constant of 1.0×10^{-2} atm-m^3/mol at 25°C indicates that TCE has a high tendency to volatilize. Volatilization rates will depend upon temperature, water movement, depth, and air movement above the surface. Volatilization of TCE is slower from soil than from water. Once in the atmosphere, TCE is degraded through reaction with hydroxyl radicals to form hydrochloric acid, carbon monoxide, carbon dioxide, and carboxylic acid (ATSDR 1997). This is probably the most important transport and fate process for TCE in the unsaturated layer of soil and surface water.

Degradation and Persistence. Photo-oxidation and hydrolysis of TCE do not appear to be significant fate processes. Studies of photolysis and hydrolysis demonstrated that photolysis did not contribute substantially to the transformation of TCE and that hydrolysis does not occur under normal environmental conditions.

Biodegradation is the most important transformation processes for TCE in natural water systems and soil. Anaerobic degradation of TCE is a process that proceeds along a reductive dehalogenation pathway (i.e., a chorine atom is replaced by a hydrogen atom; McCarty and Vogel 1985). Thus:

TCE → dichloroethenes → vinyl chloride → ethylene → carbon dioxide

Aerobic degradation of TCE occurs through cometabolism, as compounds are degraded by enzymes produced during the degradation of a more degradable primary substrate (e.g., BETX compounds). Much of the research into aerobic degradation of chlorinated aliphatics has focused on the methanotrophic bacteria, which are known to aerobically degrade the chlorinated aliphatics. The bacteria require a source of methane or methanol to be present. Since methane is present in the groundwater near the source areas, aerobic degradation is a possible process near those areas. Aerobic degradation chains are:

TCE→dichloroethene→vinyl chloride→carbon dioxide

Biodegradation rates of TCE and the other CVOCS in subsurface soil and groundwater vary considerably with the type of soil, water chemistry, hydrologic conditions, types of microbes, organic content temperature, pH, Eh, amount of oxygen, and the presence of other nutrients. The expected half-life of TCE in groundwater, under aerobic or anaerobic conditions with sufficient organic substrate and microbes is similar ranging from 0.5 to about 1 year to 0.25 to 2 years, respectively (Table 4-4).

Reductive dechlorination of TCE is occurring at OMC Plant 2 as indicated by the presence of the degradation products cis-1,2-DCE and vinyl chloride. The evidence for degradation is presented in Section 4.5, which discusses natural attenuation processes.

cis-1,2-Dichloroethene (cis-1,2-DCE)

Under anaerobic conditions, it is common to find 1,2-dichloroethenes that are formed as breakdown products from reductive dechlorination for TCE and PCE. The cis-1,2-DCE isomer is most frequently observed in the reductive dechlorination process (Wiedemeier et al. 1998).

Mobility and Partitioning. cis-1,2-DCE is more mobile than its parent product TCE because of its higher water solubility and higher vapor pressure. The K_{oc} value of 35.5 mL/g indicates that cis-1,2-DCE tends to be mobile in soils and will not partition significantly from water to soil. The relatively high Henry's law constant indicates that the compound should also readily volatilize from moist soil surfaces or surface water.

Degradation and Persistence. Once in the atmosphere, the dominant atmospheric removal process for cis-1,2-DCE is predicted to be reaction with photochemically generated hydroxyl radicals. This reaction reduces cis-1,2-DCE to formic acid, hydrochloric acid, carbon monoxide, and formaldehyde. In water, chemical hydrolysis and oxidation probably are not environmentally important fate process for cis-1,2-DCE. Direct photolysis of cis-1,2-DCE is also not likely to be important in sunlit natural waters (ATSDR 1996).

In water, cis-1,2-DCE generally resists biodegradation under aerobic conditions. cis-1,2-DCE undergoes reductive dechlorination under anaerobic conditions with cis-1,2-DCE degrading to vinyl chloride. Studies suggest that anaerobic biodegradation in soil may be the main mechanism by which cis-1,2-DCE degrades in soil.

Vinyl Chloride

Mobility and Partitioning. Vinyl chloride is more soluble in water and has a higher vapor pressure than cis-1,2-DCE, its parent product. Volatilization from aquatic and terrestrial systems is the most important transport process for distribution of vinyl chloride throughout the environment. Photo-oxidation of vinyl chloride is the dominant environmental fate of vinyl chloride. Vinyl chloride reacts rapidly with hydroxyl radicals, forming hydrogen chloride or formyl chloride. Formyl chloride, if formed, rapidly decomposes to yield carbon monoxide and hydrogen chloride. Vinyl chloride in the atmosphere is expected to be destroyed within 1 or 2 days of its release. The hydrogen chloride is reported to be removed from the troposphere during precipitation (Irwin 1997).

Photolysis does not appear to be an important fate process in aquatic systems. Based on available information, hydrolysis, sorption, bioaccumulation, and biodegradation do not appear to be important environmental fate processes (Clement 1985).

The relatively high vapor pressure indicates that the compound volatilizes quite rapidly from dry soil surfaces. The estimated K_{oc} indicates a very low sorption tendency, meaning that this compound would be highly mobile in soil. Thus vinyl chloride has the potential to leach into groundwater. Vinyl chloride is soluble in water (low K_{ow} and high water solubility) and thus can leach through the soil and enter the groundwater before evaporation can occur.

Degradation and Persistence. Reaction of gaseous vinyl chloride with photochemically generated hydroxyl radicals is predicted to be the primary degradation mechanism for this compound in the atmosphere. The rate constant for this reaction has been measured as 6.96×10^{-12} cm^3/mol-second.

The primary removal process for vinyl chloride from surface waters is volatilization into the atmosphere. Since the volatilization rate of vinyl chloride is much more rapid than the predicted rate of hydrolysis, hydrolysis is not a significant aquatic fate.

Vinyl chloride can undergo microbial degradation under aerobic conditions through direct oxidation. Degradation of vinyl chloride generally occurs slowly in anaerobic groundwater and sediment; however, under methanogenic or iron (III) reducing conditions, anaerobic degradation occurs more rapidly.

4.2.3 Carcinogenic Polynuclear Aromatic Hydrocarbons

CPAHs are a broad class of compounds ranging from low molecular weight components, such as benzo(a)anthracene, to high molecular weight compounds such as dibenz(a,h)anthracene. Benzo(a)pyrene was selected as the representative chemical for the CPAH contaminant category because it is considered to be carcinogenic and has a low Tier 1 criteria.

Mobility and Partitioning

Solubility and volatility vary widely across this class of compounds. CPAH constituents present in subsurface soils may be adsorbed to soil organic carbon. The low molecular weight CPAHs have higher water solubilities and are more likely to be released into groundwater than the higher molecular weight CPAH compounds.

Benzo(a)pyrene has low water solubility and strong sorption to soil particles, and thus limited leaching potential. It also has low vapor pressure that results in low potential for the contaminant to migrate to the atmosphere. The overall mobility of benzo(a)pyrene in soil, sediment, surface water, and air is expected to be slow relative to other VOCs at the site.

Degradation and Persistence

Photolysis and biodegradation are two common attenuation mechanisms for CPAHs. Although CPAHs transform in the presence of light by photolysis, the transformation rates are highly variable among different CPAHs. Photolysis may reduce concentrations of these chemicals in surface water or surface soils, but it is not relevant to subsurface soils. The ease of biodegradation of CPAHs in soils is also extremely variable across the chemical class. Generally, the lower molecular weight CPAHs biodegrade more readily than the higher molecular weight CPAHs; however, site-specific biodegradation estimates are difficult because of the many factors that affect the rate. These factors include the availability of electron receptors, types of microorganisms present, the availability of nutrients, the presence of oxygen, and the chemical concentration (FRTR 2002).

Literature values vary widely for half-life estimates for CPAHs because of the numerous variables involved. Using conservative half-life estimates, CPAHs show an increase in half-life associated with an increase in molecular weight. The half-life estimate for benzo(a)pyrene is presented in Table 4-4.

CPAH degradation occurs more slowly in aquatic environments than in the atmosphere, and the cycling of CPAHs in aquatic environments is poorly understood. In surface water, CPAHs can evaporate, disperse into the water column, become incorporated into bottom sediments, concentrate in aquatic biota, or undergo chemical oxidation and biodegradation. The most important processes for the degradation of CPAHs in aquatic systems are photooxidation, chemical oxidation, and biological transformation by bacteria and animals. Most CPAHs in aquatic environments are associated with particulate materials. Only about

33 percent are present in dissolved form. CPAHs dissolved in the water column degrade rapidly through photooxidation. CPAHs degrade most rapidly at higher concentrations, at elevated temperatures, at elevated oxygen levels, and at higher incidences of solar radiation.

The ultimate fate of CPAHs that accumulate in sediments is believed to be biotransformation and biodegradation by benthic organisms. CPAHs in aquatic sediments degrade slowly in the absence of penetrating radiation and oxygen, and they may persist indefinitely in oxygen poor basins or in anoxic sediments. The burial of contaminated sediments deep beneath deposits of organic matter can effectively remove these sediments from interaction with surface water and biota.

Animals and microorganisms can metabolize CPAHs to products that undergo complete degradation. CPAHs in soil may be assimilated by plants, degraded by soil microorganisms, or accumulated to relatively high levels in the soils. Specific enzymes present in mammals metabolize CPAHs, making them water soluble and available for excretion. Metabolic pathways detoxify CPAHs, but some metabolic intermediates may be toxic, mutagenic, or carcinogenic to the host. Fish and most crustaceans possess the enzymes necessary for metabolism and excretion, but some mollusks and other invertebrates are unable to efficiently metabolize CPAHs. The biological concentration factor (BCF) for PAHs (used for development of ambient water quality criteria) is 30.

4.3 Potential Migration Pathways

4.3.1 Source Areas

An understanding of source areas is critical to understanding how contaminants may disperse in the environment. Based on the nature and extent of contamination observed at the site, the identified source materials or affected areas include the following:

- Porous and nonporous PCB-contaminated building materials
- PCB- or CPAH-contaminated soils north of the plant near former loading docks and tank areas, and in the open area north of the trim building, the former die cast UST/AST area, and the dune area east of the site
- PCB-contaminated sediment in the North and South ditches
- DNAPL encountered in the courtyard area north of the trim building and based on high TCE concentrations may also be present at locations beneath the metal working area, near the chip wringer room and west of the trim building
- TCE-contaminated soil and groundwater related to the use of chlorinated solvents, beneath the building and the groundwater plume extending south of the building

4.3.2 Release and Transport Mechanisms

Potential routes of migration for contamination exist where chemicals can be released to the environment from source material or affected media. The primary contaminant release and transport mechanisms from OMC Plant 2, based upon the current understanding of conditions at OMC Plant 2, are:

- Movement of site compounds to the air and migration offsite through the atmosphere
- Leaching of contaminants into groundwater by precipitation (or directly if source material is in contact with the groundwater) and subsequent dissolved phase transport to groundwater discharge areas such as surface water bodies (Lake Michigan or Waukegan Harbor)
- Surface runoff of contaminants to ditches, low lying areas, or surface water bodies by dissolving in stormwater runoff or by soil erosion

Figure 4-1 depicts a generalized site conceptual model showing contaminant migration pathways.

Releases to the Air

The two primary release mechanisms for contaminants into the air are volatilization and contaminated dust.

Volatilization. PCBs can be released from the building materials and soils to the atmosphere. Volatilization of PCBs from the contaminated building materials appears to be occurring. Aroclor 1242 was detected during USEPA's removal activities in 2003 ranging from 4.2 to 18 $\mu g/m^3$ (Tetra Tech 2003). The higher concentrations in the old die cast area and lower concentrations in the metal working area are consistent with the PCB distribution in building materials based on the wipe sample and concrete core results. Volatilization of PCBs from the surface soils is not considered a major release mechanism because of adsorption of PCBs onto the organic matter in the fill (average total organic carbon 1,600 mg/kg).

VOCs (including CVOCs and BTEX compounds) are characterized by relatively high vapor pressures, Henry's law constants, and water solubility and generally low organic carbon partitioning coefficients as compared to the PCBs. As a result, they can be released to the air through the pore spaces in the soil. Because of the OMC Plant 2 building and pavement covering most of the site, this is not a major release mechanism for VOCs in the soil and groundwater to the atmosphere. The soil gas sample results support that volatilization from the groundwater plume south of the site is not a major release mechanism.

CPAHs are characterized by low vapor pressures and water solubility and are unlikely to be released to the air through pore spaces in the soil. Together with this information and much of the OMC Plant 2 building and pavement covering as stated, significantly limit the amount of vapor migration to the atmosphere.

The future land use for the site includes construction of residential buildings. Cracks and gaps in the foundation may provide a direct path for the migration of contaminated soil gas into the building structure. Construction of any buildings on the site would need to include controls to mitigate potential vapor intrusion.

Contaminated Dust. Contaminants in the building materials (PCBs) or surface soil (PCBs and CPAHs) can be released to the atmosphere as airborne dust. CPAHS and PCBs were detected in surface soils or on the surface of building materials. Contaminants bound to the soil particles could be released to the air as dust. Because buildings, pavement, gravel, or vegetation cover most of the contaminated areas, release of contaminants to the air as dust is limited.

The potential for release of contaminated dust to the atmosphere will be greatest when the building or ground is disturbed by site activities, such as building demolition, construction, or excavation.

Releases to Groundwater

Precipitation percolating through surface and subsurface soil can dissolve contaminants and transport them to the groundwater. Contaminants also can dissolve directly into the groundwater from the DNAPL sources. The contaminants can then be transported in the direction of groundwater flow. The following mechanisms can influence the migration of contaminants dissolved in groundwater:

- **Advection**—Transport of solutes by flowing groundwater. Advection is the primary transport mechanism for dissolved contamination.
- **Dispersion**—Spreading of solutes from the path they would be expected to follow according to simple advection. Dispersion results from spatial variation in aquifer properties, the tortuous nature of interconnected pore spaces and molecular diffusion.
- **Sorption**—Retention of dissolved chemicals on the soil matrix because of partitioning between the groundwater and aquifer matrix surfaces. The migration of contaminants is slowed as adsorption and desorption occur within the aquifer matrix.
- **Degradation**—Biological decomposition or chemical alteration of contaminants.

Not all contamination moves through the aquifer matrix as a solute in groundwater. Liquid oils and solvents not dissolved in the groundwater (DNAPLs) may migrate in somewhat different directions than the groundwater because of their physical characteristics.

Potential discharge areas for the OMC Plant 2 groundwater include Lake Michigan and Waukegan Harbor.

PCBs and CPAHs strongly adsorb to soil particles, have low water solubility, are persistent in the environment (do not readily break down leading to bioaccumulation), and thus do not migrate in the environment. Conversely, VOCs have high water solubility and generally do not adsorb as strongly to soil particles and are have high mobility in the environment.

Releases to Surface Water and Sediment

Contaminants can be released from source material to surface water or sediment through several means. Contaminated groundwater can migrate to surface water bodies through seepage discharge into waterways (such as ditches). Water level data indicate that groundwater at OMC Plant 2 flows toward Lake Michigan or Waukegan Harbor and that the North Ditch is not a discharge area. The recent groundwater sample results indicate that contaminated groundwater does not appear to have migrated far offsite and does not extend to Waukegan Harbor or to Lake Michigan.

Overland transport of PCBs occurred in the past as part of the stormwater system. Surface runoff of PCB-contaminated sediment in the north and south drainage ditches and surface soil in the dune area can erode and carry materials to Lake Michigan. Because of the site topography and the "cap" effect generated by the building, pavement, gravel, or vegetation covering most of the contaminated areas, the overall potential for transport of contaminated soils into offsite surface waters by erosion and surface flow is limited. Future plans for site development including an Eco-Park that transitions to mixed marina-related commercial and residential use will also limit the continued transport of contaminated soils to offsite surface water. The need for additional site controls will be evaluated in the feasibility study.

4.4 Transport and Fate Mechanisms

This subsection addresses the potential for releases of contaminants from facility operations and their subsequent specific transport and fate in the environment. Transport and fate mechanisms are physical, chemical, and biological processes that affect the form and distribution of a chemical in the environment. The behavior of chemicals is controlled by both the properties of individual chemicals and site-specific characteristics.

Contaminant fate processes for site-related contaminants in the surface and subsurface include volatilization, dispersion, adsorption, and biodegradation.

4.4.1 Volatilization

Volatilization can be an important loss mechanism for PCBs in soil. The volatilization of PCBs from the building material has been documented by air sampling conducted during USEPA's removal action. Based on the high organic content measured in the fill materials (average total organic carbon of 1,600 mg/kg), volatilization of PCBs from contaminated surface soil is not a significant loss mechanism.

Volatilization of CVOCs may be a possible loss mechanism from unsaturated soil but is not significant in the saturated soils because groundwater is a larger transport mechanism where a large percentage of the contamination exists.

4.4.2 Dispersion

Dispersion, the process by which concentrations are reduced as a result of horizontal and vertical spreading, will result in further reduction of contaminant concentrations. Lateral dispersion of contaminants within the unsaturated zone is not significant because of the short distance to the groundwater table. Vertical dispersion occurs for CVOCs, but because the main source of the contaminant is a DNAPL, dispersion is not a significant mechanism for contaminant reduction.

Degradation of TCE within the groundwater is expected to be a more significant mechanism. The distribution of CVOCs downgradient of the potential source areas in groundwater indicates that degradation is occurring (Figure 4-1).

4.4.3 Adsorption and Transport

Adsorption plays a significant role in the migration of contaminants, especially CPAHs and PCBs, from the sources identified at the site. The adsorption and transport is controlled by both the physical characteristics of the site as well as properties of individual chemicals. The properties that will affect the transport of contaminants in the groundwater include:

- **Groundwater flow** — Dissolved contaminants in groundwater will move primarily in the horizontal direction determined by the gradient. Adsorption to soils may retard the contaminant velocity relative to the groundwater flow velocity
- **Organic carbon content of soils** — Soils with higher total organic carbon (TOC) measurements ranged in the fraction of organic carbon (f_{oc},) from nondetect to 0.019, with an average of 0.0013.
- **Bulk density of soil** — samples collected ranged from 1.19 to 1.89 grams per cubic centimeter (g/cc), with an average value of 1.44 g/cc.
- **Distribution coefficient, Kd** — chemical specific value. The higher the K_d values the stronger the affinity to soil, resulting in lower migration potential.

The average values for these properties are presented in Table 4-6.

Groundwater Flow

Groundwater flow velocities vary across OMC Plant 2 depending on the characteristics of the subsurface materials and the hydraulic gradients. The hydraulic gradients beneath the building are flat (0.0004 ft/ft) and increase toward the south near Waukegan Harbor. The change in hydraulic gradients may be the result of the sheet piles restricting groundwater discharge into the harbor. The calculated groundwater velocities ranged from about 70 to 150 feet/year in the shallow zone and 6 to 30 feet/year in the deeper zone of the aquifer. The overall site average groundwater velocity is estimated to be about 70 feet/year (Table 4-6).

Contaminant Migration

Contaminants in the groundwater will move primarily in a horizontal direction that is determined by the hydraulic gradient (that is, advection); however, if contaminants undergo chemical reactions while being transported through an aquifer, their migration rate and extent may be reduced (that is, retarded) relative to the average groundwater velocities. Such chemical reactions may include adsorption, and partitioning into soil organic matter. The ratio relating the average groundwater velocity to the contaminant plume it is carrying is referred to as the retardation coefficient, R. In order to estimate the retardation coefficient, both the properties of the specific contaminant and the characteristics of the aquifer system must be considered.

The partitioning of compounds between the soil matrix and the groundwater was determined by calculating the, K_d values for the representative chemicals (Table 4-6). As noted, the K_d is a function of the organic carbon partitioning coefficient and the organic carbon content in the aquifer matrix. Empirical reference K_{oc} values and the average f_{oc} value of 0.00097 were used in the calculations.

The retardation of a chemical species can be calculated by (Freeze and Cherry 1979):

$$R = 1 + \frac{(\rho_b \times K_d)}{n_e}$$

where:

ρ_b = soil bulk density = 1.74 g/cm^3
K_d = distribution coefficient, mL/g
n_e = effective porosity (decimal percent) = 0.30

The values for K_{oc}, K_d, and R for the selected chemicals are presented in Table 4-6. PCBs and benzo(a)pyrene have high K_d values indicating that they have a strong affinity to the soil matrix and are therefore, less mobile. The velocity of each compound in groundwater can then be determined by:

$$V_c = \frac{V_w}{R}$$

in which:

V_w = average linear velocity of groundwater, ft/day
V_c = velocity of contaminant plume in groundwater, ft/day

The estimated migration rates for the representative chemicals are presented in Table 4-6.

cis-1,2-DCE and vinyl chloride have the lowest estimated retardation factors of the CVOCs. The calculation indicates these compounds dissolved in groundwater could migrate at a rate of about 60 feet/year (assuming the average groundwater velocity of 70 feet/year and no degradation). The migration rates for the other organic compounds range from 0.03 to 40 feet/year based on the assumed groundwater velocity of 70 feet/year. As anticipated based on K_d and K_{oc} properties, PCB has the highest affinity for soils and would take an estimated travel time of over 1,500 years to migrate 50 feet. These data are consistent with relatively few number of groundwater sample with detectable concentrations of PCBs and CPAHs.

Biodegradation

Biodegradation is a significant removal mechanism for the representative site-related VOCs. To a lesser extent, CPAHs and PCBs are less likely to be degraded and tend to bioaccumulate as stated in Section 4.3.2. Based upon groundwater monitoring data for shallow and deep groundwater, chlorinated "parent" products in groundwater (TCE) is being degraded by anaerobic reductive dehlogenation and other natural attenuation processes to transformation products (cis-1,2-DCE and vinyl chloride). An evaluation to determine if site conditions are conducive to biodegradation is presented in the next section.

The dissolved groundwater concentrations over time can be described using a first-order decay rate constant (Wiedemeier et al. 1995). The first-order decay is described by:

$$C_t = C_o e^{-kt}$$

in which:

C_t = concentration (µg/L) at time, t
C_o = initial concentration (µg/L) at time, t = 0
k = attenuation rate coefficient, years^{-1}
t = time (years)

The attenuation rate, indicating how much of a compound will degrade (is consumed) over a given time, was determined using the half-lives for the time at which the C_t/C_o is one-half. Once the attenuation rate was determined, the time for the dissolved chemical to attain the target level was estimated based on the maximum concentration and a target concentration equivalent to the TACO Tier 1 Groundwater Remediation Objectives for Class I Aquifers. The results of these calculations are presented in Table 4-7.

The transport times, combined with conservative estimates of biodegradation suggest that significant attenuation is expected to occur, which would limit the plume size of chlorinated compounds. The time necessary for the reduction of the dissolved concentration to the Tier 1 levels was estimated using the maximum groundwater concentrations detected and conservative values for degradation in water under anaerobic conditions (Table 4-7). Vinyl chloride is a conservative example of a compound that will adversely affect groundwater because it has a high solubility, low groundwater criteria, and a relatively slow degradation rate. The maximum vinyl chloride concentration of 16 mg/L in groundwater would require between about 4 and 26 years for concentrations to reach a concentration of 0.002 mg/L (2 µg/L), assuming degradation occurs under anaerobic conditions.

4.5 Natural Attenuation

The groundwater monitoring data for the shallow and deep groundwater zones were evaluated to demonstrate that natural attenuation is occurring at the site. USEPA recommends a lines-of-evidence approach (OSWER Directive 9200.4-17P, 1999) in evaluating natural attenuation. The first line of evidence uses historical groundwater data to clearly demonstrate a decreasing trend in contaminant mass or concentration. Where data are inadequate for the first line-of-evidence, a second line can be evaluated that involves characterizing the nature and rates of natural attenuation using hydrogeologic and geochemical data. The third line-of-evidence demonstrates biological degradation processes occurring at the site. This last line-of-evidence is clearly the strongest line-of-evidence that natural attenuation processes are occurring at the site, as TCE degradation products cis-1,2-DCE and vinyl chloride were detected at various concentrations at the site.

At OMC Plant 2, there is insufficient long-term groundwater data to document concentration trends. Thus, the first line of evidence approach could not be utilized at this site. This section focuses on developing the evidence that natural attenuation is occurring based the TCE degradation products observed at the site.

4.5.1 Natural Attenuation of Chlorinated Compounds

Natural attenuation is a remediation approach that relies on natural processes that work to reduce mass and concentration of contaminants in soil and groundwater. Natural attenuation processes include dispersion, dilution, abiotic transformation, volatilization, sorption, and biodegradation. Biodegradation is often the most important process for compounds that can be transformed by indigenous microorganisms (Wiedemeier et al. 1996). At this site, the process of interest includes the degradation of TCE.

Microorganisms naturally occur in subsurface soil and sediment. Several conditions are necessary for microbial growth. First, there must be a carbon source or substrate available in a form that the microorganism can assimilate. Second, appropriate electron acceptors must be present to allow the microorganism to respire. Third, nutrients must be available to the microorganisms. The nutrients are typically available in the soil/sediment, and this condition is not rate limiting (DuPont 1992).

Many microorganisms obtain energy by oxidizing organic substrates. Microorganisms perform this by transferring electrons from electron donors (e.g., the organic substrate) to compounds that accept electrons. Common electron acceptors include oxygen, nitrate, manganese (IV), iron (III), sulfate, and carbon dioxide. In natural aqueous systems, the use of electron acceptors in microbial metabolism tends to follow a natural succession corresponding with decreasing oxidation-reduction potential (ORP). The succession starts with molecular oxygen (aerobic respiration) and nitrate (denitrification), and ends with SO_4 (sulfate reduction) and carbon dioxide (methanogenesis). The electron acceptors will be reduced during respiration (e.g., nitrate to nitrite, sulfate to sulfite).

The biodegradation of TCE and its daughter products is possible by several mechanisms, including reductive dehalogenation, cometabolism, and direct oxidation. Reductive dehalogenation involves the transfer of electrons from a donor (e.g., organic substrate) to the CVOC acceptor, resulting in the replacement of chlorine with hydrogen. The process results in the formation of intermediate or daughter CVOCs. Significant anaerobic conditions (sulfate reducing or methanogenic) are required for reductive dehalogenation. The reductive dechlorination of TCE to ethene becomes progressively more difficult to carry out for each subsequent reaction. As a result, cis-1,2-dichloroethene (cis-1,2-DCE) and vinyl chloride tend to accumulate in anaerobic environments (Wiedemeier et al. 1998).

Cometabolism is the transformation of CVOCs by nonspecific enzymes (oxygenases) produced by microbes during the metabolism of specific primary substrates (i.e., methane, toluene, phenol, propane, ethene, propene, cresol, ammonia, isoprene, etc.) under aerobic conditions. Cometabolism likely will occur only on the fringes of the area of CVOC detections where aerobic conditions are present. Rates of cometabolism increase as the number of chlorine atoms on the CVOC molecule decrease. TCE, DCE, and vinyl chloride can cometabolize under aerobic conditions, but is less likely due to the limited dissolved oxygen observed.

Direct oxidation involves the use of CVOCs as the sole source of carbon (primary substrate) by microbes. CVOCs are the primary substrate when they are the source of carbon and energy for the microbes. Aerobic conditions are necessary for direct oxidation. Only lesser chlorinated compounds, such as vinyl chloride, are susceptible to direct oxidation, and likely will occur only on the fringes of the area of CVOC detections where aerobic conditions exist.

4.5.2 Natural Attenuation Screening

The screening process outlined in the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (Wiedemeier et al. 1998) was used to evaluate the potential for reductive dechlorination at the site. The first step in this screening process was to examine the overall geochemical conditions to determine if the conditions are favorable for anaerobic biodegradation to occur (Table 4-8). The second step compared the conditions within TCE plume areas and non-impacted areas (Table 4-9). Based on data collected in April and May 2005 and the natural attenuation evaluation, "adequate evidence" supporting anaerobic biodegradation of chlorinated organics in the shallow and deep groundwater at the site. The distribution of total CVOCs in shallow and deep groundwater are presented in Figures 3-25 to 3-30, respectively. The highest concentrations of TCE generally are found in deep groundwater north of the plant near the former chip wringer area and east of the Old Die Cast Area in the courtyard north of the Trim Building (collectively referred to as the "source areas"; Figure 3-28). For this evaluation, the "plume" or affected area is defined by locations with total CVOC concentrations exceeding 0.1 mg/L (Figures 3-25 to 3-30) and includes nested monitoring wells MW-503, MW-504, MW-511, MW-512, and MW-514.

TCE and its daughter products, cis-1,2-DCE and vinyl chloride were detected across the site but at highest concentrations near the chip wringer and within the vicinity and south of the Old Die Cast Area. As expected the highly mobile contaminant vinyl chloride is detected in more locations and at greater distances than TCE and cis-1,2-DCE. The presence of cis-1,2-DCE and vinyl chloride provide evidence that TCE is undergoing biodegradation at the site.

Ethane and ethene are daughter products of vinyl chloride and the nontoxic end-products of the reductive dechlorination of TCE. The presence of these compounds is significant where the chlorinated solvents are suspected of undergoing biological transformation. In general, ethene and ethane concentrations were most significant along northern portions of the Old Die Cast Areas (MW-502 to MW-506). Ethene is more prevalent and at higher concentrations within the deep groundwater as compared to the shallow groundwater and ethane were detected a similar amount of times within the shallow and deep groundwater but at higher concentrations within the shallow aquifer.

Monitoring wells sampled from the April/May 2005 sampling event were divided based on depth to a shallow (0 to 15 feet below ground) and a deep (15 to 30 feet below ground) zone. The findings relative to the individual natural attenuation parameters are discussed below.

Dissolved oxygen (DO) concentrations in the groundwater below 1 mg/L indicate that anaerobic conditions are present and the reductive dehalogenation pathway is possible. DO values greater than 1 mg/L indicate that aerobic conditions may prevail, preventing reductive dechlorination but allowing aerobic degradation of vinyl chloride. Because atmospheric oxygen can be easily introduced during sampling, other indicators of anaerobic conditions such as ORP, absence of nitrate, and presence of dissolved iron or dissolved manganese can be used to evaluate the redox condition of the groundwater. In the shallow and deep aquifers, DO measurements were less than 1 mg/L in more than one half of the monitoring wells indicative of anaerobic conditions. In general, only a few monitoring wells across the site (10 of 57) had DO measurements above 1 mg/L.

When present at higher concentrations (greater than 1 mg/L), nitrate may compete with the reductive pathway of contaminants. Site wide nitrate is predominantly below 1 mg/L for all monitoring wells sampled and is indicative of reductive dechlorination, as this is most favorable when nitrate is less than 1 mg/L.

In addition to nitrate analyses, one reduced form of nitrogen, nitrite, was also analyzed, but was detected in only one sample for the April/May groundwater sampling event.

Reduction of nitrate, as observed, may have occurred in a form other than nitrite or sample methods may have resulted in a loss of nitrite prior to analyses.

Dissolved manganese was found at elevated concentrations in the shallow aquifer at monitoring wells MW-503 and MW-504 (0.91 to 1.1 mg/L) in the area of highest CVOC concentrations as compared to upgradient and sidegradient locations. The distribution of higher dissolved manganese concentrations in the area of highest CVOC detections relative to upgradient and sidegradient locations indicates that manganese reduction has occurred and reductive dechlorination of the CVOCs is possible.

Iron reduction is significant across the site and appears to indicate reducing conditions and possible indicator of anaerobic degradation and reductive dechlorination of vinyl chloride. During this process, iron (III) is used as an electron acceptor and reduced to iron (II) and accumulates at elevated concentrations. Similar to nitrate concentrations, the iron (II) concentration are conducive to reductive dechlorination processes.

Sulfate can also be used as an electron acceptor once oxygen and nitrate are depleted. Sulfate concentrations are slightly lower in the shallow aquifer of the plume area, ranging from 19 to 140 mg/L as compared to those in areas not affected by TCE of 0.76 to 300 mg/L. In the deep aquifer, sulfate concentrations are much more variable, ranging from 3 to 1,100 mg/L. Sulfate levels above 20 mg/L may result in competitive exclusion of reductive dechlorination. In particular, reductive dechlorination for cis-1,2-DCE is slower under sulfate reducing conditions. This would explain the presence of elevated cis-1,2-DCE concentrations in the deep aquifer. In addition to sulfate analyses, a reduced form, sulfide, also was analyzed. It was not detected in any shallow monitoring well and was detected in only three deep monitoring wells south and east of the plume area. Where detected it ranged from 1.6 mg/L (MW-515D, sidegradient location) to 4.6 mg/L (MW-516D, downgradient location). The sporadic detection of sulfide and its distribution of detection in predominately downgradient and sidegradient locations supports the variability of sulfate reduction, as indicated in the sulfate data discussed above.

Methane generally was found to be present across the site at elevated concentrations. Within the plume area, methane ranged from 0.043 to 4.1 mg/L with 5 of the 10 monitoring wells (4 within the deep aquifer, 1 in the shallow aquifer) at concentrations exceeding 0.5 mg/L, indicating that anaerobic biodegradation by methanogenesis is occurring there.

Alkalinity concentrations are compared to an upgradient concentration of 137 mg/L (W-11). High alkalinity is evidence of reductive dechlorination because microbial respiration releases carbon dioxide into the groundwater. The carbon dioxide reacts with water to form an acid that dissolves carbonate materials in the aquifer matrix. Dissolution of those materials results in higher concentrations of calcium and magnesium, and thus increased alkalinity. There were no significant elevated concentrations of alkalinity in the plume area.

TOC is a general measure of organics, including naturally occurring organics and anthropogenic organic sources that could include CVOCs, and petroleum-related VOCs. These measurements do not distinguish between the types of organic compounds present. TOC values in the plume area wells sampled for natural attenuation parameters are low (less than 40 mg/L), suggesting that available electron donor (organic substrate) is low in the groundwater. The areas not affected by TCE indicate TOC ranging from 1.2 to 160 mg/L.

Chloride is released to groundwater during the reductive dechlorination of CVOCs. W-11, which is upgradient of the source area, has a concentration of chloride at 230 mg/L) and minimal detection of total CVOCs at 0.54 µg/L. Within the plume area, none of the monitoring wells has a concentration equal to or greater than twice the background concentration of MW-11. Some locations outside the plume area (MW-3D, MW-515D, and MW-516D) have increased concentrations of chloride that may be attributed to their proximity to the road and road salting and the former Waukegan Coke Plant facility. The chloride in the wells is likely a combined result of degradation and road salting.

There is no discernible pattern for the distribution of pH and temperature values. All measurements of pH are within the optimum range for degradation (5 to 9). Temperatures are all below 20°C and, therefore, biochemical processes are not accelerated.

The redox potential of groundwater (Eh) is a measure of electron activity and is an indicator of the relative tendency of a solution to accept or transfer electrons. Redox reactions in groundwater usually are biologically mediated and, therefore, the redox potential of a groundwater system depends upon and influences rates of biodegradation. The redox potential of groundwater generally ranges from -400 millivolts (mV) to 800 mV (Weidermeir et al. 1994). Reductive dechlorination may occur under a wide range of anaerobic redox conditions but is possible at Eh values less than 50 mV. In the plume area, positive ORP results generally were measured in the shallow aquifer, whereas negative ORP was observed in the deep aquifer. Only one location within the plume area (MW-514D) had an ORP value greater than 50 mV (Eh value of 250 mV), suggesting that redox conditions are near optimal for reductive dechlorination.

4.5.3 Data Interpretation Summary

TCE and its daughter products cis-1,2-DCE, vinyl chloride, and the presence of ethane/ethenes provide evidence that active biodegradation of TCE is occurring at the site. As expected, the highest concentrations of daughter products are near the suspected source areas and based on contaminant velocities, it appears the daughter products have been degraded at a rate greater as the plume should be significantly longer, providing evidence that other significant processes are occurring to degrade the CVOCs

Based on the groundwater monitoring results, it appears that the site contains many reducing environment characteristics conducive to reductive dechlorination of CVOCs. Reducing conditions increase with depth at the site and few locations across the site represent aerobic conditions.

Within the shallow groundwater plume, there are varying degrees of redox conditions. In general, nitrate concentrations are low, methane concentrations are high, and the presence of DCE, vinyl chloride and ethene/ethane at favorable concentrations suggests that TCE degradation is occurring and that anaerobic degradation is taking place. Within the deep groundwater plume, much of the same lines of evidence are observed but with more vindication of reducing conditions and anaerobic degradation taking place.

The apparent discrepancy between the lack of optimal conditions for reductive dechlorination and the presence of degradation products may be because either sufficient organic substrate was available in the past, or the monitoring wells are not in areas where organic substrate is present and allowing reductive dechlorination to occur. BTEX was detected at fewer locations and at lower concentrations within the shallow groundwater as compared to the deep groundwater. The BTEX within the shallow groundwater may be the remnants of more significant past BTEX concentrations that could have served as the organic substrate for reductive dechlorination. The other possibility is that there are more concentrated areas, such as areas downgradient of MW-503 and MW-504, where organics are present in much more elevated concentrations and serve as organic substrate.

Overall, it appears that natural attenuation is occurring. Reductions in total CVOCs in groundwater, increases in daughter products, and trends in site conditions indicate that degradation is occurring. The rate of natural attenuation at OMC Plant 2 may be limited in the future as a result of inadequate organic substrate to serve as the electron donor in reductive dechlorination. If necessary, the rate and success of natural attenuation could be enhanced by the injection of additional substrate at the source area.

SECTION 5

Human Health Risk Assessment

This section summarizes the human health risk assessment (HHRA) that was conducted to assess the potential human health impacts from exposure to site constituents under current and anticipated future site-use conditions. Prior to implementing this RI, pre-RI data were reviewed and results indicated that concentrations of constituents in environmental media associated historical activities at OMC Plant 2 could pose risks to human health that exceed both an excess lifetime cancer risk (ELCR) of 1×10^{-4} and a hazard index (HI) of 1.

The overall objective of this HHRA is to characterize of the potential human health risks associated with site-related constituents, and information for making decisions regarding the need for, and potential scope of, possible remedial action. The detailed descriptions of the methods, assumptions, and calculations for the exposure and toxicity assessments, risk characterization, and uncertainty assessment are provided in Appendix E.

This HHRA has been prepared utilizing conservative assumptions, and feasible exposure pathways that are based on current site conditions and both current and potential future site use. Use of these conservative assumptions (consistent with a reasonable maximum exposure scenario) is intended to overstate rather than understate the potential risks.

5.1 Human Health Risk Assessment Approach

Based on the results of the pre-RI data review, the HHRA was performed initially using a screening analysis that consisted of comparing media concentrations to risk-based values in tables from USEPA's Region 9 PRGs or in their absence Region 3 Risk-Based Concentrations [RBCs]) and the State of Illinois' TACO program. In addition to this screening analysis, an exposure assessment and toxicity assessment were performed based on USEPA guidelines. These assessments were used to evaluate exposure pathways and receptors not specifically covered by USEPA or TACO programs and to develop cumulative risk estimates for comparison with USEPA target risk reduction goals (USEPA 1991).

A conceptual model of potential exposure pathways was developed for the OMC Plant 2 site to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes a specific environmental pathway by which a receptor can be exposed to the chemicals in environmental media.

The conceptual model presented below incorporates the site setting and distribution of chemical results presented in this RI report. It also incorporates anticipated future site conditions described in the City of Waukegan's Lakefront Master Plan.

5.2 Conceptual Model of Exposure Pathways

5.2.1 Exposure Setting

The current physical setting for the site is described in Section 2. The current land use in the vicinity of OMC Plant 2 is primarily marine-recreational and industrial, but also includes utilities and a public beach east of the site. The nearest residences are about 0.3 miles west of the site on top of a bluff. The City of Waukegan's Lakefront Master Plan indicates that the future development of the property will likely include demolition of the plant, development of the property, and restoration of the beachfront area for public access. The plan defines the northern portion of the OMC Plant 2 property as an "Eco-Park" development that transitions to mixed-use marina-related commercial and residential use on the southern portion of the property (Figure 2-1)

5.2.2 Identification of Potentially Exposed Populations

Current

The OMC Plant 2 site consists of about 65 acres, upon which are situated a 1,036,000-square foot former manufacturing plant building and several parking lot areas to the north and south of the building complex. The property has been unoccupied since it was abandoned by OMC in 2002. The buildings are locked and access to the property is restricted by fences and locked gates. Under current conditions, there are unlikely to be potential exposure pathways with the exception of trespassers entering the existing OMC building.

The site, surrounding properties, and the City of Waukegan obtain potable water from Lake Michigan. The city has no municipal potable wells; however, there are some private residential wells within the city limits at a distance from the site (URS 2000). The exact locations of these private residential wells are not known; however, based on the location of the site relative to the lake and residential areas and the regional and site-specific hydrogeological data, there are no existing residential wells that could be impacted by this site. Therefore, current residential land use, including potable groundwater use, was not further evaluated in this HHRA.

Future

For purposes of this HHRA, the potentially exposed populations would be located within the existing structure or future structures and in open access areas. For the future exposure scenarios, these selected populations include:

- Residents
- Recreational users
- Construction workers

5.2.3 Identification of Potentially Complete Exposure Pathways

The potential exposure pathways under current conditions may involve trespassers entering the OMC Plant 2 building. These individuals could potentially become exposed to PCBs through dermal contact with contaminated surfaces.

Potentially complete exposure pathways under future land uses addressed in this HHRA are shown in Figure 5-1. These future pathways are briefly described for each of the potentially exposed populations:

- Residents: Based on the City of Waukegan's Master Plans, the anticipated future land use includes residential and commercial uses. As part of this development, the majority of the site soils would likely be covered with buildings, pavement, landscaping, and clean fill soils. Therefore, it was assumed that there would be limited direct contact with chemicals in surface soils and no direct contact pathway with groundwater. There could be potential inhalation exposure pathways to VOCs from indoor vapor intrusion and releases through the soil column to outdoor air. Although the use of local groundwater as a potable water source is improbable based on the presence of a municipal water supply and future institutional controls (e.g., deed restrictions and well permitting requirements), it is USEPA's policy that all groundwater be protected for beneficial use as a potential drinking source. Therefore site groundwater was evaluated for its potential impacts to human health under a residential scenario.
- Recreational users: Recreational users could potentially be exposed to chemicals in surface soils, through soil ingestion and dermal contact. It is assumed that recreational users could come into contact with surface soils in the proposed city park area to be constructed across the northern portion of the property, and the dune area to the east of the site.
- Construction workers: Construction workers could potentially be exposed to chemicals in surface and subsurface soils, and in groundwater. Construction workers could potentially be exposed through soil ingestion, dermal contact with soil or groundwater, inhalation of VOCs from soil or groundwater, and inhalation of particulates suspended into the air from soil.

5.3 Comparison to Risk Based Remediation Objectives

The following subsection describes the methodology and results of the risk-based remediation objectives evaluation for soil/soil and groundwater/groundwater media.

5.3.1 Methodology for Soil

Measured concentrations of constituents detected in individual surface soil and subsurface Soil samples were compared to USEPA Region 9 PRGs that model target risk levels from ingestion, inhalation of volatile compounds and particulates, and dermal absorption pathways. Soil concentrations were also compared to the TACO Tier 1 RO values (35 IAC 742 Appendix B, Table B) for the ingestion and inhalation exposure routes under the residential and construction worker settings. Measured concentrations in surface and subsurface soil samples were also compared to the TACO Tier 1 RO values (35 IAC 742, Appendix B, Table B) for the soil component of groundwater ingestion route as described in Section 742.505.

USEPA Region 9 PRGs for residential soil and the most stringent of the TACO ingestion or inhalation routes under the residential soil were selected as the criteria for residential soil screening. When a USEPA Region 9 PRG was not available, the USEPA Region 3 RBC was considered. PAHs and PCBs exceed both USEPA and TACO screening criteria. Aroclor-1260 exceeded USEPA criteria, but not the TACO values. USEPA Region 9 PRGs for industrial soil and the TACO Tier 1 values were selected as the criteria for construction worker scenario. TCE, PAHs and PCBs exceeded the USEPA and TACO screening criteria. Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene all exceeded USEPA criteria, but not TACO values.

5.3.2 Methodology for Groundwater

Measured concentrations of constituents detected in individual groundwater samples were compared to USEPA Region 9 Residential Tap Water PRGs that includes ingestion of groundwater from drinking and inhalation of volatile compounds. Groundwater constituents were also compared to the most stringent of the Illinois Class I or II groundwater standards (35 IAC 742 Appendix B, Table E), cited as Tier 1 groundwater RO values for the groundwater component of the groundwater ingestion route. This screening process was a conservative evaluation for groundwater because the Class I groundwater standards are based on a daily human consumption of 2 liters of water per day, although groundwater is not considered a potable water source.

USEPA Region 9 PRGs for tap water and the TACO Tier 1 groundwater criteria for Class 1 groundwater were selected as the criteria for groundwater screening. Region 3 RBCs were considered where Region 9 PRGs were not available. Chloroform, cis-1,2-DCE, trans-1,2-DCE, TCE, vinyl chloride, PCBs, arsenic and manganese exceeded USEPA and TACO screening criteria. 1,2-DCA, benzene, and iron exceeded USEPA criteria, but not TACO.

5.4 Exposure and Toxicity Assessments

An exposure assessment and toxicity assessment were conducted based on USEPA guidelines and was developed using reasonable maximum exposure (RME) assumptions. This assessment addressed a range of current and future land use scenarios. The results of these assessments are presented in Tables 5-4 through 5-6.

The conclusions from this assessment were as follows:

- Potential risks to trespassers who might enter the OMC Plant 2 building currently on the site consisted of potential dermal contact with PCBs detected on building surfaces. This exposure scenario was associated with an ELCR of 2 x 10^{-5}. This estimated risk falls within USEPA's target range for risk reduction of 1 x 10^{-4} to 1 x 10^{-6}.

- Potential risks to future residents:

  - The ELCR from direct contact with onsite soils were 4 x 10^{-4}, driven largely by carcinogenic PAHs. This estimated risk is slightly higher than USEPA's target range for risk reduction. Direct contact with soils was associated with a cumulative noncancer HI of 0.2, which is below USEPA's target value for risk reduction (a noncancer HI of one). Noncancer risks from direct contact with soil were driven by PCBs. This potential exposure pathway is likely to be limited, based on feasible future land uses projected for the site.

- The ELCRs from residential use of groundwater were 2×10^{-2}, higher than USEPA's target range for risk reduction and driven by arsenic, vinyl chloride, and TCE. The cumulative noncancer HI for residential adults and children was 141, and 325, respectively, significantly higher than USEPA's target range for risk reduction. The noncancer HI was driven by arsenic, TCE, and Arochlor-1248.
- The ELCR from indoor inhalation resulting from vapor intrusion from groundwater were 6×10^{-4} and the noncancer HI from vapor intrusion was 3. These risks are higher than USEPA's target range for risk reduction. The estimated cancer risks are driven by vinyl chloride in groundwater. Noncancer risks are driven both by vinyl chloride and TCE. Note that estimated risks from TCE could be up to 65-fold higher, if these risks were characterized using USEPA's proposed cancer slope factor.
- The ELCRs to residents inhaling outdoor air containing volatile releases from groundwater were well below 1×10^{-6} and the noncancer HI was much less than 1, both well below USEPA's target range for risk reduction.

- The ELCRs to recreational users of proposed park land and the dune area east of the site were 1.5×10^{-4} for adult recreational users and 1.1×10^{-4} for adolescents; the cumulative noncancer HI was 2.6 for adults and 4.9 for adolescents. These risks are slightly higher than USEPA's target range for risk reduction. Note that the noncancer hazard index does not include potential noncancer risks for some PCB mixtures, and therefore might be underestimated. The use of existing concentrations as exposure concentrations may overestimate risk as it does not consider that additional soil cover will needed to construct the park.
- The ELCRs to construction workers from potential direct contact with soils was 1×10^{-5}; the cumulative noncancer HI was 0.5. These risks fall within USEPA's target range for risk reduction. Excess lifetime cancer risks from potential contact with groundwater were 6×10^{-4}, and the cumulative noncancer hazard index was slightly less than 7. Both are higher than USEPA's target range for risk reduction and were driven by VOCs in groundwater.

5.5 Human Health Risk Assessment Summary

Based on current characterization data, the estimated risks to human health were higher than USEPA target risk reduction objectives in different portions of the site. The estimated risks are based on the assumption that remedial actions are not conducted to address these concentrations. Under current conditions, there are no potentially complete exposure pathways with the exception of trespassers entering the OMC Plant 2 building. Potential contact with PCBs in building materials by these individuals is unlikely to represent human health risks higher than USEPA target risk reduction objectives.

The estimated future risks are based on the assumption that the site is redeveloped for residential and recreational uses as described in the City of Waukegan's Master Plan. Chemicals in soil that are potentially driving risks within the footprint of the OMC Plant 2 building principally are PCBs and CPAHs. Chemicals in groundwater potentially driving risks are CVOCs, including TCE, vinyl chloride and cis-1,2-DCE, arsenic, and PCBs. PCBs and PAHs in soil within proposed future recreational areas to the north and east of the OMC Plant 2 building potentially drive human health risks in those areas.

SECTION 6
Ecological Risk Assessment

6.1 Introduction

This section summarizes the ecological risk assessment (ERA) performed at the OMC Plant 2 site. The complete ERA is presented in Appendix F. The overall objective of the ERA is to evaluate whether contaminants present at the site and surrounding areas represent a potential risk to exposed ecological receptors. Based on the outcome of the ERA, recommendations will be made about the need for additional investigation.

The scope of this ERA encompasses both onsite and offsite habitat that currently exists or may be created as part of future development of the site. Currently, potentially exposed ecological receptors are predominantly in the dune area east of the site, but may also occur to some extent in the maintained areas (e.g., mowed lawn habitats) surrounding the buildings. The City of Waukegan currently has plans, as described in its Lakefront Master Plan, to create a city park within and north of the existing building footprint, as well as conservation of the dune area east of the site (Figure 2-1). Because of these plans, this ERA evaluates both a current use scenario (based upon existing conditions) and a future use scenario (based upon the creation of higher quality habitat as part of the Master Plan) for terrestrial areas on and adjacent to the site.

Impacts to aquatic habitat in the dune area, Lake Michigan, and Waukegan Harbor are not considered in this ERA. Impacts to aquatic habitat in the dune areas (the North and South ditches) are currently being investigated, and contaminated sediments will be removed. Although groundwater discharge to Lake Michigan and Waukegan Harbor is occurring, groundwater data do not indicate the groundwater impacts extend to these discharge areas. In addition, future remedial actions are expected to minimize offsite contaminant transport and potential impacts would be reduced to very low levels through dilution. Therefore, for this ERA, aquatic habitats were assumed to be not impacted, and risks to aquatic receptors were not considered.

The methods and approaches used in this ERA were developed from applicable USEPA ERA guidance for Region 5. As described in USEPA ERA guidance, a screening-level ERA (SLERA) consists of three main components: (1) problem formulation, (2) analysis, and (3) risk characterization. If the results of the SLERA suggest that further ecological risk evaluation or data collection is warranted for a particular site, the ERA process would proceed to the baseline ERA (BERA), which is a more detailed phase of the ERA process (Steps 3 through 7).

6.2 Screening-Level Problem Formulation

The screening-level problem formulation establishes the goals, scope, and focus of the SLERA. As part of problem formulation, the environmental setting was characterized in terms of the habitats and biota known to be present. The types and concentrations of chemicals present in ecologically relevant media were also described. A preliminary conceptual model was developed that describes potential sources, potential transport pathways, potential exposure pathways and routes, and potential receptors. Assessment and measurement endpoints were then selected to evaluate those receptors for which complete and potentially critical exposure pathways were likely to exist. The fate, transport, and toxicological properties of the chemicals present, particularly the potential to bioaccumulate, were also considered during this process.

6.2.1 Environmental Setting

The existing habitats and biota within the assessment area, encompassing OMC Plant 2 and the surrounding areas are described below.

Habitat

As discussed in Section 2.3, the most significant ecological features near the site include Lake Michigan, Waukegan Beach, and the Illinois Beach State Park (Figure 1-1). The Lake Michigan shoreline, including a portion of Waukegan Beach, is located east of the site. Illinois Beach State Park is located about 1.5 miles north of the site.

Onsite. Onsite terrestrial habitat exists but is limited to maintained/mowed grassy and gravel areas surrounding the building complex and parking lot areas. This habitat is considered low quality. Wetlands or aquatic habitat are not present onsite.

Dune Area The dune area consists of 13 acres directly east of the OMC Plant 2 site, extending from the North Shore Sanitary District's southern property boundary to the South Ditch. The North Shore Sanitary District's secondary outfall discharges into the North Ditch.

An environmental site investigation, including habitat identification, was performed by Deigan & Associates (2004) for the City of Waukegan in July 2004. The resulting *Environmental Site Investigation Report* is included in Appendix A.

Biota

Biota that may be present at the site, or in the site vicinity, were determined from previous investigations (CH2M HILL 1995; Deigan & Associates 2004), a search the Department of Illinois Habitat Diversity database for species collected from Lake County, and Christmas bird counts for the Waukegan count circle. Amphibians, reptiles, birds, and mammals that may occur in the vicinity of the site are presented in Appendix F. The Illinois Department of Natural Resources also identified 13 plants species, 1 invertebrate species, and 5 bird species that are threatened or endangered (federal or state) and may be found within 1 mile of OMC Plant 2. These threatened or endangered species are also listed in Appendix F

6.2.2 Summary of Analytical Data

Existing chemical concentrations in surface soil are characterized in Section 3. Chemical groups detected include metals, PCBs, SVOCs(including PAHs), and VOCs. Surface soil summary statistics were calculated for detected chemicals under the current use scenario and includes all soil samples collected outside of the building footprint (see Appendix F). Surface soil samples were defined as those with a starting depth at less than 0.5 foot. The future redevelopment scenario was evaluated using the recreational scenario dataset described in Section 5, and includes samples collected footprint of the proposed park along the northern section of the site, as well as the dune area, per the Lakefront Master Plan.

6.2.3 Preliminary Ecological Conceptual Model

The conceptual model for the site was described in Section 4. The preliminary ecological conceptual model is presented in Figure 6-1. The potential source(s) of the chemicals and the pathway of contaminant transport through environmental medium to surface soil onsite and to the dune area east of the site are discussed in Section 4. Complete exposure pathways currently exist for terrestrial ecological receptors in these areas (current use scenario) and also potentially exist for terrestrial ecological receptors in onsite areas with created habitat (future use scenario). In both scenarios, terrestrial animals may be exposed to chemicals in soil via direct contact with the soil, incidental ingestion of soil, and ingestion of contaminated food items for chemicals that have entered food webs. Terrestrial vegetation may be exposed to chemicals via direct contact of roots to soils. Exposure to chemicals present in the surface soil via dermal contact may occur but is unlikely to represent a major exposure pathway for upper trophic level receptors because fur or feathers minimize transfer of chemicals across dermal tissue. Direct contact is a potential exposure route for soil invertebrates. Exposure to chemicals through drinking water ingestion was not considered in this ERA because aquatic habitat was not considered in this ERA.

Receptor Species

The following upper trophic level receptor species were chosen for exposure modeling:

- Short-tailed shrew (*Blarina brevicauda*) – terrestrial mammalian insectivore
- Meadow vole (*Microtus pennsylvanicus*) – terrestrial mammalian herbivore
- Red fox (*Vulpes vulpes*) – terrestrial mammalian carnivore
- American robin (*Turdus migratorius*) – terrestrial avian insectivore
- Red-tailed hawk (*Buteo jamaicensis*) – terrestrial avian carnivore
- Mourning dove (*Zenaida macroura*) – terrestrial avian herbivore

Lower trophic level receptor species, including threatened and endangered plant species, were evaluated based upon those taxonomic groupings for which medium-specific screening values have been developed; these groupings and screening values are used in most ecological risk assessments. As such, specific species of terrestrial plants and soil invertebrates (earthworms are the standard surrogate) were evaluated using soil screening values developed specifically for these groups. Because terrestrial plant screening values were also intended to be protective of individual threatened and endangered species, the most conservative values (e.g., lowest no observed effect concentration [NOEC]) were selected.

Upper trophic level receptor species quantitatively evaluated in the ERA were limited to birds and mammals (as shown in the preceding list), the taxonomic groups with the most available information regarding exposure and toxicological effects. Individual species of reptiles were not selected for evaluation because of the general lack of available toxicological information for these taxonomic groups from food web exposures. Potential risks to reptiles from exposure via the food web were evaluated using other fauna (birds and mammals) as surrogates. Potential risks to these groups from direct exposures to soil were evaluated using screening values developed for other taxonomic groups (described above).

Assessment and Measurement Endpoints

An assessment endpoint is an explicit expression of the environmental component or value that is to be protected. A measurement endpoint is a measurable ecological characteristic that is related to the component or value chosen as the assessment endpoint. Table 6-1 summarizes the assessment and measurement endpoints selected for the ERA.

6.3 Screening-Level Effects Assessment

Chemical-specific surface soil screening values were developed to evaluate soil flora communities, individual threatened and endangered terrestrial plant species, and soil fauna. The soil-based screening values used in this ERA are provided in Appendix F.

Ingestion screening values for dietary exposures were derived for each upper trophic level receptor species and bioaccumulating chemical. Only soil-associated constituents with the potential to bioaccumulate, as identified in USEPA documents, were evaluated for exposures via food webs. Ingestion-based screening values for birds and mammals are provided in Appendix F.

6.4 Screening-Level Exposure Assessment

Maximum detected constituent concentrations in surface soil were used in the SLERA to conservatively estimate potential exposures for the ecological receptors selected to represent the assessment endpoints.

Upper trophic level receptor exposures to constituents in surface soil were determined by estimating the concentration of each constituent in each relevant dietary component. Incidental ingestion of soil was included when calculating the total exposure. Dietary items for which tissue concentrations were modeled comprised terrestrial plants, soil invertebrates, and small mammals. The methodologies used to derive these tissue concentrations are described in Appendix F.

6.5 Screening-Level Risk Calculation

The maximum exposure concentrations in soil or exposure doses (upper trophic level receptor species) were compared with the corresponding screening values to derive screening risk estimates. The outcome of this step is a list of constituents of potential ecological concern (COPECs) for each medium-pathway-receptor combination evaluated or a conclusion of acceptable risk.

COPECs are selected using the hazard quotient (HQ) method. HQs are calculated by dividing the constituent concentration in the medium being evaluated by the corresponding medium-specific screening value or by dividing the exposure dose by the corresponding ingestion screening value. In accordance with the guidance followed for this SLERA, constituents with HQs greater than or equal to 1.0 are considered COPECs.

Two sets of risk calculations were performed, direct exposure (lower trophic level receptors) and food web exposure (upper trophic level receptors), for both the current use and future redevelopment scenarios. The results of these calculations are presented in Tables 6-2 to 6-5.

6.5.1 Scientific Management Decision Point

Several COPECs were identified in surface soils for both the current and future redevelopment risk scenarios. This point in the ERA process represents a scientific management decision point (SMDP). Because the risk estimate is believed to be too conservative or uncertain for decision-making purposes, the ecological risk assessment process should proceed to the BERA (Step 3). The first part of Step 3 involves refining the assumptions and methods used in the SLERA to be more realistic to actual ecological receptor exposure and potential effects conditions.

6.6 Baseline Problem Formulation (Step 3)

The SLERA resulted in a set of COPECs for surface soil for both the current and future redevelopment risk scenarios. This set of COPECs included constituents with HQs greater than or equal to 1.0 (based upon maximum exposures) and detected constituents for which screening values were not available.

6.6.1 Refinement of Conservative Screening Assumptions

In the initial step of the BERA, the COPECs from the SLERA were reexamined based upon more realistic exposure assumptions to determine if they truly pose a potential risk, and decisions were made about whether or not some or all of the COPECs should be eliminated from further consideration. The assumptions, parameter values, and methods that were modified for the Step 3 refinement are described in Appendix F.

Only COPECs and receptors identified in the SLERA as requiring further evaluation were addressed in the Step 3 refinement.

6.6.2 Refined Risk Characterization

The following subsections summarize the results of the Step 3 refinement.

Direct Exposure

Mean chemical concentrations in surface soil for the current use scenario were compared with soil screening values in Table 6-6 Based upon this comparison, total chromium, iron, vanadium, and 16 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding 1.0 for soil flora. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), bis(2-ethylhexyl)phthalate, and naphthalene had HQs equaling or exceeding 1.0. Chemicals that had HQs equaling or exceeding 1.0 or were without screening values were retained as refined COPECs.

Mean chemical concentrations in surface soil for the future redevelopment scenario were compared with soil screening values in Table 6-7. Based upon this comparison, total chromium, iron, vanadium, and 15 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding 1.0 for soil flora. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260) and bis(2-ethylhexyl)phthalate had HQs equaling or exceeding 1.0. Chemicals that had HQs equaling or exceeding 1.0 or were without screening values were retained as refined COPECs.

Food Web Exposure

HQs based upon mean exposure doses for the current use scenario and each upper trophic level receptor species are summarized in Table 6-8. HQs for PCBs (PCB-1248, PCB-1254, and PCB-1260), based upon the lowest observed adverse effect level (LOAEL), exceeded one for the shrew. HQs for PCB-1248 based upon a comparison to the no observed adverse effect level (NOAEL) exceeded one for the meadow vole, red fox, and American robin, although the HQs based upon the LOAEL were less than 1.0. HQs for PCB-1254 and PCB-1260 based upon a comparison to the NOAEL also exceeded 1.0 for the American robin, although the HQs based upon the LOAEL were less than 1.0.

HQs based upon mean exposure doses for the future redevelopment scenario and each upper trophic level receptor species are summarized in Table 6-9. HQs for PCBs (PCB-1248, PCB-1254, and PCB-1260), based upon the LOAEL, exceeded 1.0 for the shrew. HQs for PCB-1248, based upon a comparison to the NOAEL, exceeded 1.0 for the meadow vole, red fox, and American robin, although the HQs based upon the LOAEL were less than 1.0. HQs for PCB-1254 and PCB-1260 based upon a comparison to the NOAEL also exceeded 1.0 for the American robin, although the HQs based upon the LOAEL were less than 1.0.

6.6.3 Risk Evaluation

The potential for adverse effects associated with the refined COPECs from the Step 3 refinement are evaluated in this section.

Current Use Scenario

In the current use scenario, based upon mean concentrations, metals and SVOCs had HQs equaling or exceeding 1.0 for soil flora, and metals, SVOCs, and PCBs (PCB-1248, PCB-1254, and PCB-1260) had HQs equaling or exceeding 1.0 for soil fauna. In addition, two detected SVOCs (carbazole and dibenzofuran) could not be evaluated because screening values were not available for plants. For birds and mammals, HQs for PCBs exceeded one for the short-tailed shrew, meadow vole, red fox, and American robin, although estimated food web exposure doses exceeded LOAEL-based ingestion screening values only for the shrew. Because LOAEL-based ingestion screening values were not exceeded by exposure doses for all receptors except the shrew and PCBs, population-level impacts to upper-trophic level receptors (the assessment endpoint evaluated) are unlikely, and further investigation is not needed.

An evaluation of metal concentrations that exceeded screening values indicates that they are relatively ubiquitous and at concentrations below background and adverse effect levels. Maximum and average concentrations of aluminum, chromium, iron, manganese, and vanadium for the current use scenario and the future redevelopment scenario were compared to background Illinois statewide background concentrations for counties within municipalities in Table 6-10. Maximum and average concentrations did not exceed background concentrations.

Total chromium was detected at all locations in the offsite dunes (range of 2.4 to 10 mg/kg). The screening values for chromium were derived by Efroymsen et al. (1997a-b), and low confidence was placed on these values because of the small number of studies on which they were based. No effects were also observed at concentrations in studies evaluated by Efroymsen et al. above those observed at the site. Because total chromium concentrations were below state-wide background levels, actual effect levels are uncertain, no injury was observed at the site, and the total chromium exposure doses for upper-trophic level receptors were below screening values based on only the more toxic hexavelent form, no further investigation of chromium is necessary.

As stated in the Eco-SSL for iron (USEPA 2003b), specific concentrations of iron likely to cause adverse effects are not available. A pH guideline was used that describes the form of iron likely to be present. Because the average pH in the offsite dunes is above 8 and the sand is well-aerated, the insoluble ferric form of iron is more likely present, indicated decreased iron availability to plants. Under extreme conditions, this may result in iron deficiency to plants. Because the receptors at the site are assumed to be adapted to ambient conditions, the concentrations were below statewide background levels, and no injury was observed at the site, no further investigation of iron is necessary.

Manganese was detected at all locations in the offsite dunes (range of 75 to 270 mg/kg). The manganese screening value is based on effects to soil microflora, and low confidence was placed on this value because of the small number of studies on which it was based. No effects were also observed at concentrations in studies evaluated by Efroymsen et al. above those observed at the site. While soil microflora are important components of the ecosystem, effects on soil invertebrate populations was the assessment endpoint evaluated in this ERA. In a study by Kuperman et al. (2003), earthworm, enchytraeid, and collembolan reproductive EC20s were estimated at 116, 629, and 1,209 mg/kg, respectively. Although collembolans are more likely to present in the sandy off-site dunes, only three samples (S-01, S-02, and S-04) had concentrations that slightly exceeded the lowest (earthworm) EC20. Because manganese concentrations were below state-wide background levels, only a limited area of impact exists, if any, that is unlikely to affect populations of soil invertebrates (the assessment endpoint evaluated), and no injury was observed at the site, no further investigation of manganese is necessary.

Vanadium was detected at all locations in the offsite dunes (range of 5.3 to 13 mg/kg). The screening value is based on effects to plants from a single study, and confidence in the benchmark is low (Efroymsen et al. 1997a). Because vanadium concentrations were below statewide background levels, actual effect levels are uncertain, and no injury was observed at the site, no further investigation of vanadium is necessary.

An evaluation of the spatial distribution of SVOCs and PCBs in surface soil that exceeded screening values, as well as carbazole and dibenzofuran, suggests a spatially limited area of potential risks, with most exceedances in onsite areas that have low quality habitat. The onsite terrestrial habitat consists of maintained/mowed grassy and gravel areas surrounding the building complex and parking lot areas, and does not currently provide habitat for threatened and endangered plant species. The magnitude of the exceedances was also below a factor of 10 for all chemicals except 2-methylnaphthalene and naphthalene, which suggests only low to moderate levels of risk when it is considered that these exceedances are based on conservative screening values and suitable habitat is assumed to exist. If an uncertainty factor of 10 is applied to the conservative screening values to derive less-conservative screening values (analogous to NOAEL to LOAEL uncertainty factor of 10), there would be few exceedances and risks would be considered low. The screening values for 2-methylnaphthalene and naphthalene are based on concentrations equal to 25 percent reduction in seedling emergence and earthworm mortality with an uncertainty factor of 100 applied and are therefore considered very conservative. For the short-tailed shrew, although exposure doses for PCBs exceed screening values based on LOAELs, the onsite area is expected to contribute little to the total exposure dose as this area is fragmented and more suitable contiguous habitat exists in the adjacent offsite dune area.

In the offsite dune area, sample concentrations of PCBs exceeded screening values for soil flora, soil fauna, and the short-tailed shrew. Concentrations of all SVOCs, except bis(2-ethylhexyl)phthalate, did not exceed screening values in the offsite dunes area. The highest concentrations of PCBs are in the northwest corner of the dune area, and directly adjacent to the east containment cell. These areas were identified by Diegan & Associates (2004) and were further delineated by USEPA (Tetra Tech 2005). USEPA has determined that an area with PCB concentrations greater than 10 mg/kg in surface soil be removed to a depth of 2 feet and replaced with clean soil containing less than 1 ppm PCBs. Following these removal activities, PCB screening values for soil flora, soil fauna, and the short-tailed shrew will not be exceeded. Thus, currently recommended remedial efforts, when implemented, are expected to reduce risk from PCBs to acceptable levels.

Risks from bis(2-ethylhexyl)phthalate, which had sample locations that exceeded screening values in the offsite area, dibenzofuran, which was detected in the offsite area but had no screening value, and carbazole, which was not detected in the dune area, are considered negligible. The screening values for bis(2-ethylhexyl)phthalate (100 µg/kg), which is a target value for total phthalates from MHSPE (1994), is considered very conservative. An additional value (60 mg/kg) is also listed for total phthalates, which represents levels considered seriously contaminated. This value is nearly two orders of magnitude greater than the maximum concentration observed in the offsite dunes area (0.77 mg/kg). Thus, these low concentrations are unlikely to impact ecological receptors. Dibenzofuran was detected at only one location at low levels (5.9 µg/kg). This limited spatial extent is also unlikely to impact ecological receptors. Because carbazole was only detected in onsite areas with low quality habitat, concentrations are unlikely to impact ecological receptors.

Although the onsite areas have concentrations of SVOCs and PCBs that, if associated with higher quality habitat, could pose potential risks to soil flora, soil fauna, and/or mammalian insectivores, the low quality of the habitat limits potential exposure and thus adverse effects. Risks in the onsite areas are therefore considered low under current conditions. Higher quality habitat is found in the offsite dune areas, where ongoing remedial efforts will reduce risk from PCBs to acceptable levels. Based on this evaluation of current risks to ecological receptors, no further investigation is necessary.

Future Redevelopment Scenario

The results of the future redevelopment scenario are similar to that for the current use scenario except that higher quality habitat could be created in onsite areas. As noted for the current use scenario, ongoing remedial efforts are expected to reduce risk to acceptable levels that require no future investigation in the dune areas. In the onsite areas, there are potential risks from PCBs and SVOCs if habitat is created in areas with high surface soil concentrations.

For PCBs although area-wide average concentrations do not exceed terrestrial plant screening values, there is the potential for colonization of the created habitat by threatened and endangered species, which should be protected at the individual level, through dispersal from the nearby areas. Because estimated food web exposure doses of metals, PCBs, and SVOCs do not exceed LOAEL-based ingestion screening values for all receptors except the short-tailed shrew, population-level impacts to these receptors (the assessment endpoint evaluated) are unlikely. For small insectivorous mammals such as the short-tailed shrew, there are potential risks from PCBs if habitat is created in areas with high concentrations in the surface soil.

Potential onsite risks to these receptors in the future scenario can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for any "hot spots" that remain.

6.6.4 Uncertainty Analysis

Uncertainties are present in all risk assessments because of the limitations of the available data and the need to make certain assumptions and extrapolations based on incomplete information (Appendix F).

6.7 ERA Conclusions

Based on the evaluation conducted in this ERA using conservative and more realistic exposure assumptions, potential risks to ecological receptors currently exist from PCBs in an isolated area in the dunes east of the site and in a future redevelopment scenario with created habitat in areas with high concentrations of SVOCs and PCBs. In the dune area, an evaluation of the spatial distribution of PCBs in surface soil indicates a limited area associated with potential risks to soil flora, including threatened and endangered plant species, soil fauna, and small insectivorous mammals. However, USEPA has determined that an area with PCB concentrations greater than 10 mg/kg in surface soil be removed to a depth of 2 feet and replaced with clean soil containing less than 1 ppm PCBs. Following these removal activities, risks to these receptors are considered acceptable, and no further investigation is required. No other COPEC identified in the conservative Step 2 evaluation was considered to pose a risk to ecological receptors following the COPEC Refinement, and no further investigation is warranted.

In the future redevelopment scenario, soil flora, including threatened and endangered plant species that may colonize created habitat, soil fauna, and small mammal screening values were exceeded by average concentrations of SVOCs and PAHs, indicating potential risks if suitable habitat is created in these areas and the soil concentrations are reflective of post-development conditions. Potential onsite risks to ecological receptors in the future redevelopment scenario can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for the remaining areas with concentrations exceeding the remedial action goals developed for the site.

SECTION 7

Summary and Conclusions

The remedial investigation integrated results from previous investigations with new data to determine the nature and extent of contamination at the OMC Plant 2 site, assess the risk to receptors, and provide data to evaluate remedial alternatives. New data included analytical results from building materials, storm sewer sediment, surface and subsurface soil, onsite and offsite groundwater, and the DNAPL. A MIP investigation was used to delineate the groundwater CVOC plume and to identify new monitoring well locations. Seventeen new monitoring well nests, consisting of a water table and a deep well, were installed across the site and one nest was installed south of the site on the Larsen Marine Service property.

7.1 Physical Characteristics

The subsurface materials encountered include near-surface fill materials above a naturally occurring sand unit that overlies clay till. The fill deposit extends from 2 to 12 feet bgs. Underlying the fill, is a poorly graded sand or silty sand to a depth of about 25 to 30 feet. This relatively permeable sand unit comprises an unconfined aquifer with a geometric mean hydraulic conductivity of about 2.0×10^{-2} centimeters per second (cm/sec) and an average porosity of about 30 percent. Beneath the sand unit is 70 to 80 feet of hard gray clay that forms the lower boundary of the unconfined aquifer.

Groundwater is shallow and was encountered at depths ranging between 2 and 7 feet, depending on the ground surface elevation. Groundwater flow is generally west to east across the northern portion of the site (toward Lake Michigan) and in the southern portion of the site groundwater flows toward the south (toward Waukegan Harbor). The horizontal gradient is flat beneath the building and increases toward the south. The overall average site gradient is estimated to be 0.002 foot per foot (ft/ft). The calculated groundwater velocities ranged from about 70 to 150 feet/year in the shallow zone and 6 to 30 feet/year in the deeper zone of the aquifer. The overall site average groundwater velocity is estimated to be about 70 feet/year. Vertical gradients between the shallow and the deeper portions of the aquifer are almost non-existent.

7.2 Nature and Extent of Contamination

The findings of the field investigation relative to the nature and extent of contamination at the OMC Plant 2 included the following:

- Results from the porous and nonporous wipe samples indicate that the building materials contain concentrations of PCBs exceeding the 10 µg/100 cm² TSCA disposal criteria, with the highest PCB concentrations in the old die cast and parts storage areas. Concrete core samples from the floor and paint chip and concrete samples from these areas indicate the presence of PCBs at concentrations exceeding the 50 mg/kg TSCA disposal criteria. Analytical results indicate that metals and PCBs will not leach out of the concrete floor samples at concentrations exceeding the TACO Tier 1 Groundwater Remediation Objectives for Class 1 Aquifers.

- The manholes west of the corporate building to the triax building were found to contain varying amounts of standing water and large volumes of sediment. The plugging of the storm sewer pipe appears to be effectively preventing discharge directly to Waukegan Harbor. PCB concentrations exceeding 1 mg/kg were detected in samples from 5 of the seven storm sewer locations. The highest concentrations were found south of the triax building and just north of East Seahorse Drive.
- Concentrations of PCBs and CPAHs that exceed the TACO Tier 1 soil remediation objectives for residential properties (based on a direct contact pathway of exposure) were found in shallow soil. Elevated PCB concentrations exceeding 1.0 mg/kg (1 ppm) were detected across the site and in the dune area east of the plant. The majority of PCB concentrations in the soil beneath the plant were consistent with where the wipe and concrete core samples indicated the presence of PCBs. The results confirm that the PCB-contaminated soils (greater than 10 ppm) in the parking lot area north of the building were removed as part of OMC's remediation north of the building. The additional areas containing PCB- and/or CPAH-contaminated soil include north of the plant in the vicinity of former loading docks and tank areas, and in the open area north of the trim building, the former die cast underground storage tank/aboveground storage tank (UST/AST) area, and the dune area east of the plant. Elevated concentrations of CPAHs were also found in the area surrounding the corporate building.
- DNAPL was encountered during the MIP investigation at one location and was comprised of 1,600 g/kg of TCE. The extent of the DNAPL was investigated and not found 50 feet around the MIP-027/SO-057 location. Concentrations of TCE indicative of residual DNAPL were detected in a saturated soil sample collected from SO-081 in the area of the chip wringer.
- Groundwater contamination is mainly related to the use of chlorinated solvents, primarily TCE, in manufacturing operations at OMC Plant 2. The MIP, soil, and groundwater investigations indicate that the distribution of CVOCs is limited in extent and appears as isolated areas rather than a single plume. The MIP investigation identified five areas of which three (Areas A, B, and C) were confirmed by the soil and groundwater results. The CVOC plume extending south of the building does not appear to have migrated far offsite and does not extend to Waukegan Harbor. The components of the CVOC concentrations include TCE, cis-1,2-DCE, and vinyl chloride. The presence of TCE degradation compounds and results of natural attenuation parameters indicate that the TCE area is being degraded by anaerobic reductive dechlorination.
- The relative concentrations of site-related compounds (e.g., TCE and cis-1,2-DCE) and the predominance of compounds not detected in the groundwater samples indicate that volatilization from groundwater is probably not the major source of the VOCs detected in the soil gas samples or the indoor air samples from the Larsen Marine Service buildings.

7.3 Contaminant Fate and Transport

The primary contaminant release and transport mechanisms occurring at the OMC Plant 2 site include:

- Volatilization of organic compounds from the building materials, soil and groundwater, and migration offsite through the atmosphere. Based on previous air sampling, PCBs may be volatilizing from the contaminated building material into the atmosphere. Volatilization of organic compounds from surface soil and groundwater is not considered a major loss mechanism based on physical properties of the surface materials.
- Leaching of contaminants from source materials, including DNAPL, into groundwater and subsequent dissolved phase transport to groundwater discharge areas such as surface water bodies (Lake Michigan or Waukegan Harbor) is considered the most significant transport mechanism occurring at the site.
- Surface runoff of contaminants to ditches, low lying areas, or surface water bodies by dissolving in stormwater runoff or by soil erosion. Based on the PCB contamination detected in the sediment in the north and south ditches, surface runoff has occurred in the past. Because of the site topography and that the building, pavement, gravel, or vegetation cover most of the contaminated areas, the overall potential for current transport of contaminated soils into offsite surface waters by erosion and surface flow is limited. Future plans for site development including an Eco-Park that transitions to mixed marina-related commercial and residential use will also limit the continued transport of contaminated soils to offsite surface water. The need for additional site controls will be evaluated in the feasibility study.

The main contaminants in the surface soil (PCBs and CPAHs), tend to be persistent in the environment because they are slow to degrade and have low mobility. The contaminants in the groundwater (CVOCs) have a higher mobility and are detected further away from the source areas. Based on the typical K_d values for TCE, cis-1,2-DCE, and vinyl chloride and an average sitewide velocity, these CVOCS are estimated to travel at an average rate between about 40 and 60 feet/year, assuming no degradation of the CVOCs.

The groundwater data collected indicate that the chlorinated "parent compound" in groundwater (TCE) is being degraded by anaerobic dechlorination to transformation products (cis-1,2-DCE and vinyl chloride). Additionally, final and nontoxic degradation byproducts, ethane and ethane, were also detected at the site. Other natural attenuation data (geochemical and biochemical parameters) provide further evidence that the CVOCs are degrading in groundwater. Reductions in total CVOCs in groundwater, increases in daughter products, and trends in site conditions indicate that degradation is occurring. Continued natural attenuation monitoring is recommended to confirm trends in natural attenuation data and to evaluate seasonal variability as part of the evaluation of monitored natural attenuation (MNA) as a potential remedial approach.

7.4 Human Health Risk Assessment

An HHRA was prepared utilizing conservative assumptions and feasible exposure pathways that are based on both current and potential future site use conditions. Use of these conservative assumptions (consistent with a reasonable maximum exposure scenario) is intended to overstate rather than understate the potential risks. The HHRA was performed initially using a risk screening analysis with risk-based concentrations obtained from the USEPA Region 9's PRG tables and the State of Illinois TACO program. In addition to this streamlined screening approach, an exposure assessment and toxicity assessment were performed. These assessments were used to evaluate potential exposure pathways and receptors not addressed by the Region 9 PRGs or the TACO values, and to develop cumulative risk estimates for comparison with USEPA target risk reduction goals of excess lifetime cancer risks of 1×10^{-4} to 1×10^{-6} or a noncarcinogenic hazard index of 1. The results from comparison with the risk based values indicate several COPCs, principally PCBs and CPAHs in soil, and CVOCs in groundwater.

Based on the current characterization data, the potential risks to human health are higher than USEPA target risk reduction objectives in different portions of the site. The estimated risks are based on the assumption that remedial actions are not conducted to address the existing soil and groundwater concentrations. Under current conditions, there are no potentially complete exposure pathways with the exception of trespassers entering the OMC Plant 2 building. Potential contact with PCBs in building materials by these individuals is unlikely to represent human health risks higher than USEPA target risk reduction objectives.

The estimated future risks are also based on the assumption that the site is redeveloped for future residential and recreational uses as described in the City's Master Plan. Chemicals in soil potentially driving risks within the footprint of the OMC Plant 2 building are principally PCBs and CPAHs. Chemicals in groundwater potentially driving risks are CVOCs, including TCE and vinyl chloride. PCBs in soil within the proposed future recreational areas to the north and east of the OMC Plant 2 building drive potential human health risks in those areas.

7.5 Ecological Risk Assessment

The ERA evaluated whether contaminants present at the site and surrounding areas represent a potential risk to exposed ecological receptors. The spatial extent of the ERA encompassed both onsite and offsite terrestrial habitat that currently exists or may be created as part of future development at the site. The ERA evaluated potential risks to terrestrial plant communities, threatened and endangered plant species, soil invertebrate communities, reptiles, birds, and mammals. Risks to receptors in aquatic habitat in the offsite dune area, Lake Michigan, and Waukegan Harbor were not considered in the ERA. The methods and approaches used in this ERA were developed from applicable USEPA guidance for Region 5.

Based on the evaluation using conservative and more realistic exposure assumptions, potential risks from PCBs to ecological receptors currently exist in an isolated area in the offsite dunes area, and after future development in areas of created habitat with high concentrations of SVOCs and PCBs. In the offsite dunes area, an evaluation of the spatial distribution of PCBs in surface soil indicates a limited area associated with potential risks to soil flora, including threatened and endangered plant species, soil fauna, and small insectivorous mammals. However, following USEPA's proposed removal activities, risks to these receptors are considered acceptable, and no further investigation is required.

After future development, there are potential risks from SVOCs and PCBs to soil flora, including colonizing threatened and endangered plant species, soil fauna, and small mammalian insectivores if suitable habitat is created and the existing soil concentrations are reflective of post-development conditions. Potential onsite risks to ecological receptors after development can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for the remaining areas with concentrations exceeding the remedial action goals developed for the site.

SECTION 8

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Tables

TABLE 1-1
Description of Transformers Identified for Plant 2
OMC Plant 2

Transformer Number	Location	Transformer Insulation	Capacity (gal)	Weight of PCBs (kg)	PCB Concentration[a] (mg/kg)
1	Plant #2—Outside	M2-Oil	1,389	0	NS[b]
2	Plant #2—Inside	Askarel	290	1,142.6	28,000
3	Plant #2—Inside	Askarel	520	2,048.8	NS
4	Plant #2—Inside	Askarel	513	2,021.2	NS
5	Plant #2—Inside	Askarel	392	1,544.5	32,000
6	Plant #2—Inside	Askarel	392	1,544.5	16,000
7	Plant #2—Inside	Askarel	290	1,142.6	42,000
7B	Plant #2—Roof	Chlorextol	359	1,414.5	59,000
8	Plant #2—Inside	Askarel	392	1,544.5	34,000
8B	Plant #2—Roof	Chlorextol	434	1,710	9,600 J
9	Plant #2—Inside	Pyranol	205	807.7	53,000
10	Corp. Penthouse	Askarel	510 (71)[c]	2,009.4	–[b]
11	Plant #2—Inside	Askarel	400	1,576	44,000
12	Plant #2—Roof	C_4F_8	Dry[a]	0	NS[b]
13	Plant #2—Roof	Pyranol	240 (320)[c]	945.6	–[b]
14	Smelter Roof	Inerteen	293	1,154.4	27,000
15	Smelter Roof	Inerteen	293	1,154.4	27,000
16	Smelter Roof	Inerteen	317	1,249	NS
17	Smelter Roof	Inerteen	293	1,154.4	25,000
18	Die Cast Roof	Inerteen	293	1,154.4	29,000
19	Die Cast Roof	Inerteen	293	1,154.4	47,000
20	Die Cast Roof	Inerteen	293	1,154.4	30,000
22	Die Cast Roof	Inerteen	293	1,154.4	NS
23	Die Cast Roof	Inerteen	293	1,154.4	48,000
26	Die Cast Roof	Inerteen	293	1,154.4	27,000
27	Die Cast Roof	Inerteen	293	1,154.4	52,000
28	Die Cast Roof	Inerteen	293	1,154.4	48,000
30	Die Cast Roof	Inerteen	293	1,154.4	34,000
31	Die Cast Roof	Inerteen	293	1,154.4	38,000
32	Die Cast Roof	Inerteen	293	1,154.4	25,000

TABLE 1-1
Description of Transformers Identified for Plant 2
OMC Plant 2

Transformer Number	Location	Transformer Insulation	Capacity (gal)	Weight of PCBs (kg)	PCB Concentration[a] (mg/kg)
34	Trim Building Roof	Inerteen	293	1,154.4	35,000
TR72	Outside—owned by Commonwealth Edison	Oil[b]	6,441	0	NS
TR73	Outside—owned by Commonwealth Edison	Oil[b]	6,441	0	NS

Notes:

[a] PCB concentrations were from sampling conducted on March 26, 2003, during USEPA removal activity. 40 CFR Part 761 regulatory standard of 50 ppm was used for comparison. Transformers, except for #8, were drained and left empty.
[b] This transformer contained non-polychlorinated biphenyl fluid.
[c] Transformer capacity varied based on source. The latter capacity value in parenthesis was taken from Tetra Tech EM, Inc., 2003.
NS = Not sampled
J = The analyte was detected. The reported numerical value is considered estimated for QC reasons.

Sources: OMC. n.d. *In-Service Transformer Inventory*.
Tetra Tech EM, Inc. 2003. *EPA Removal Action Summary Report*.

TABLE 1-2
Summary of Sample Locations and Rationale for Building Investigation
OMC Plant 2

Overall Sampling Objective	Media	General Location Description	Number of Sampling Locations	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
Collect PCB data to evaluate material handling and disposal options of plant building materials.	Non-porous surfaces: unpainted metal structures and piping	Random locations within the Old Die Cast Area, Parts Storage Area, and the Metal Working Area	64 locations	64 wipe samples	TCL PCBs	To determine whether these nonporous media are contaminated and will need to be decontaminated, and, if contaminated, the type of thermal treatment or disposal required.
	Porous surfaces other than floors	Random locations within the Old Die Cast Area, Parts Storage Area, and the Metal Working Area	62 locations	62 wipe samples	TCL PCBs	To determine the relative proportion of porous surfaces that are contaminated (i.e., PCB concentration > 10 μg/100 cm^2) and to determine if further bulk sampling is needed to determine disposal requirements.
		Visually contaminated areas or where results from wipe samples > 100 μg/100 cm^2	10 locations	10 paint and concrete chip samples	TCL PCBs	To determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.
	Porous floor surfaces	Random locations within the Old Die Cast Area, Parts Storage Area, and the Metal Working Area	5 locations in the old die cast area	6	TCL PCBs	To determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.
			5 locations in the parts storage area	6	TCL PCBs	To determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.
			5 locations in the metal working area	10	TCL PCBs	To determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.

TABLE 1-2
Summary of Sample Locations and Rationale for Building Investigation
OMC Plant 2

Overall Sampling Objective	Media	General Location Description	Number of Sampling Locations	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
		Northwest corner of Chemical Storage Building	1	1	TCL PCBs	Previous samples from this area contained PCB concentrations > 10 μg/100 cm^2 in wipe samples. Core samples will be analyzed to determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.
		Northwest corner of New Die Cast Area	1	1	TCL PCBs	Previous samples from this area contained PCB concentrations > 10 μg/100 cm^2 in wipe samples. Core samples will be analyzed to determine if contaminated materials contain PCB concentrations > the TSCA disposal criteria of 50 mg/kg.
		Random locations within the Old Die Cast Area, Parts Storage Area, and the Metal Working Area	1 from each area[c]	3	TAL metals & cyanide (total) SPLP PCBs SPLP metals	Evaluate potential impacts of leaching from contaminated concrete to allow evaluation of onsite disposal alternatives.
		Plating Room	1	1	TAL metals & cyanide (total) SPLP PCBs SPLP metals	Evaluate potential impacts of leaching from contaminated concrete to allow evaluation of onsite disposal alternatives.

TABLE 1-3
Summary of Sample Locations and Rationale for Soil Investigation
OMC Plant 2

Overall Sampling Objectives	Media	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (ft)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
Confirm the nature and extent of contamination identified by previous investigations. Fill data gaps. Collect geotechnical characteristics of the soils.	Unsaturated soils	Former Die Cast UST/AST Area and along access road adjacent to dune area east of the site	Direct push methods	10	0–6 in. 2-ft interval above water table	18	TCL VOCs TCL SVOCs[b] TCL PCBs	Define eastern contaminant boundary.
	Unsaturated soils	PCB Area north of the Plant	Direct push methods	35	0–6 in. 2-ft interval above water table	73	TCL VOCs TCL SVOCs[b] TCL PCBs	Define limits of soil contamination in vicinity of PCB AST area and northern parking lot area.
	Unsaturated soils	Uncovered grassy area surrounding the Corporate Building	Direct push methods	6	0–6 in. 2-ft interval above water table	12	TCL VOCs TCL SVOCs[b] TCL PCBs	Determine if soil contamination exists in the nonpaved areas south of the plant.

TABLE 1-3
Summary of Sample Locations and Rationale for Soil Investigation
OMC Plant 2

Overall Sampling Objectives	Media	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (ft)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
	Unsaturated and saturated soils	Selected locations in area of elevated groundwater contamination	Direct push methods	8	0–4 ft Top of aquifer Bottom of aquifer	24	TCL VOCs TCL PCBs TCL SVOCs[b] TOC Porosity Bulk Density Grain Size Moisture Content Soil Oxidant Demand	Determine contaminant concentrations in soil beneath the building to allow comparison against groundwater concentrations and to allow evaluation of remedial technologies.
	Unsaturated soils	Random samples beneath building	Direct push methods	9	0–4 ft	9	TCL VOCs TAL Metals & Cyanide[c]	Determine contaminant concentrations in soil beneath the building and to correlate MIPs response to concentrations in soil.
	Unsaturated and saturated soils	Samples from borings for new monitoring wells installed outside of the building	Hollow-stem augers/ split-spoon samplers	14	Unsaturated zone sample Top of aquifer Bottom of aquifer	30	Total Organic Carbon Grain Size Porosity Bulk Density	Samples will be collected to evaluate transport properties of the unsaturated zone and groundwater flow and the transport characteristics of the aquifer.

Notes:
[a] Number of samples does not include quality control samples.
[b] PAHs and CPAHs will be analyzed as part of the SVOC list.
[c] Only soil samples taken near the plating/foundry areas were analyzed for metals and cyanide.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
Determine site-specific hydraulic gradients and groundwater velocities. Confirm the nature and extent of contamination identified by previous investigations. Fill data gaps.	Temporary borehole	Randomly selected borings adjacent to MIPs locations	Discrete groundwater grab sample	9	Shallow Zone (0–10 ft) Intermediate Zone (10–20 ft) Deep Zone (20–30 ft)	27	TCL VOCs Cr^{6+}, TAL metals (dissolved) & cyanide (total)[b] Note: If NAPL is encountered, samples will also be analyzed for TCL PCBs	Correlate MIPs response and CVOC groundwater concentrations.
	Existing monitoring wells[c]	Shallow (0–15 ft): W-13, MW-3S, MW-11S, MW-14S, MW-15S, MW-100, MW-101, MW-102 Deep (15–30 ft): W-3, W-4, W-5, W-6, W-7, W-9, W-10, W-11, W-12, MW-3D, MW-11D, MW.14D, MW-15D	Low flow sampling	21	8 shallow, 13 deep	21	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Verify water quality conditions identified by previous investigations.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
	New monitoring wells	Southwestern corner of site near Chemical Storage Building	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Determine groundwater flow onto site from former OMC Plant 3.
		Outside of chip dock area	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[d] Field analyses[e]	Monitor contamination observed in HY-35 that previously contained high VOC concentrations in the deep groundwater (36,569.4 µg/L).
		Outside of chip wringer room	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Monitor contamination observed in HY-2 and GP-8 that previously contained high VOC concentrations in the groundwater.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
		Parking lot between Old Die Cast Area and New Die Cast Area, south of former PCB ASTs	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Monitor contamination observed in HY-22 and HY-34 that previously contained high VOC concentrations in the groundwater. This location was also identified to potentially be a low spot in the till.
		Replace MW-4A/B/C well nest	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Replace damaged 3 well nest with new 2 well nest.
		Replace MW-2A/B/C well nest	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Replace damaged 3 well nest with new 2 well nest.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
		Near Corporate Offices	Low flow sampling	3	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	6	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Monitor contamination observed in HY-18, HY-9, HY-17 and TP-13 that previously contained high VOC concentrations in the groundwater. This source of the contamination in this area is unknown.
		Larson Marine Property—near Slip 4	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Groundwater contamination has not been observed in previous groundwater grab samples collected in this area. Based on groundwater flow data, this location may serve to monitor potential groundwater discharges to Waukegan Harbor.
		East property line	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Monitor groundwater contamination migration into the beach area.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations
		South of triax building just north of Seahorse Drive.	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Monitor groundwater contamination migration south of the building.
		West of building along west property boundary	Low flow sampling	1	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	2	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	Provide an upgradient location to monitor potential contamination migration onto the site from possible upgradient sources.
		Within the building	Low flow sampling	5	2 well nests: shallow water table well (0–10 ft) deep well (20–30 ft)	10	TCL VOCs TCL SVOCs[d] TCL PCBs TAL metals (total and dissolved) & cyanide (total) Natural attenuation parameters[e] Field analyses[f]	These locations will be selected based on the results of the MIPs investigation. These locations will be selected to monitor the contaminated groundwater plume under the building and will include high concentration areas as well as the plume boundaries.

TABLE 1-4
Summary of Sample Locations and Rationale for Groundwater Investigation
OMC Plant 2

Overall Sampling Objectives	Monitoring Point	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rationale behind Selection of Sampling Locations

Notes:
[a] Number of samples does not include quality control samples.
[b] Groundwater grab samples in the vicinity of the plating/foundry areas will be analyzed for dissolved metals, cyanide, and hexavalent chromium.
[c] Number of existing wells and condition will be determined during site reconnaissance.
[d] PAHs and CPAHs will be analyzed as part of the TCL SVOC list.
[e] Natural Attenuation Parameters include: methane, ethane, ethene, dissolved iron, total alkalinity, chloride, nitrate, nitrite, sulfate, sulfide, and total organic carbon.
[f] Field Analysis includes: water levels, temperature, pH, specific conductance, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity.

TABLE 1-5
Summary of Sample Locations and Rationale for Soil Gas and Indoor Air Investigation
OMC Plant 2

Overall Sampling Objective	Media	General Location Description	Collection Method	Number of Sampling Locations	Sample Depth (feet)	Number of Samples[a]	Analysis	Rational of Selection of Sampling Locations
Determine the nature of potential soil gas levels above the groundwater plume in the vicinity of Larsen Marine	Soil gas	Soil boring locations selected based on the plume boundaries in the vicinity of Larsen Marine	Collection of soil vapor samples from soil gas probes (with PRT adapters) using Summa canisters. Approximately 5 minutes of soil gas sampling per Summa canister.	5[b]	From unsaturated zone (water table estimated to be about 5 feet bgs)	5	TO-15 SIM VOCs	Assist in evaluating if gas migration is a potential migration pathway
Fill data gaps	Indoor air	Three sample locations—one in each of the main buildings on the Larsen Marine property, and one outdoor ambient air sample (background)	VOC samples are collected with SUMMA canisters by opening the flow-controlled valve and slowly filling the canister using a flow controller to collect a time-integrated sample. Typically, samples are collected over an 8-hour period.	4	Above ground	4	TO-15 SIM VOCs	Assist in defining indoor air concentrations within Larsen Marine buildings

[a] Number of samples does not include quality control samples.
[b] An initial five locations were identified based on historical site groundwater data. Five additional locations may be sampled based on the results of the MIP investigation south of Plant 2.

TABLE 2-1
Soil Properties
OMC Plant 2

Bulk Density

Material[a]	Number of Samples Collected	Range of Bulk Density (g/cm^3)	Average Bulk Density (g/cm^3)	USCS Classifications
Sands and Silty Sands	36	1.23–1.89	1.45	SP, SM/SP, SP/SM, SP/GP
Saturated Clay Materials	3	1.19–1.84	1.51	CL, HF/OH
Saturated Gravel Materials	3	1.27–1.54	1.40	GM, GP, GC
Fill Materials	12	1.20–1.59	1.39	HF

Porosity

Material	Number of Samples Collected	Range of Porosity (%)	Average porosity (%)	USCS Classifications
Sands and Silty Sands	36	18.50–41.07	31.50	SP, SM/SP, SP/SM, SP/GP
Saturated Clay Materials	3	10.79–32.39	20.09	CL, HF/OH
Saturated Gravel Materials	3	29.43–33.42	31.90	GM, GP, GC
Fill Materials	12	31.79–49.03	42.83	HF

Material	Average Porosity (%)
Average Saturated	30.00
Average Unsaturated	40.22
Average Saturated and Unsaturated	33.41

Total Organic Carbon

Material	Frequency of Sample Detections	Range of Detected TOC (mg/kg)	Average TOC[b] (mg/kg)	USCS Classifications
Sands and Silty Sands	8 of 36	170–19000	940	SP, SM/SP, SP/SM
Saturated Clay Materials	2 of 2	1200–2000	1600	CL, OL
Saturated Gravel Materials	1 of 2	1900	970	GM, GP/GM
Fill Materials	6 of 15	120–9600	1600	HF

Soil Oxidant Demand

Material	Frequency of Sample Detections	Range of Detected SOD (g/kg)	Average SOD (g/kg)	USCS Classifications
Sands and silty sands	12 of 13	0.01–0.6	0.11	SP, SM/SP, SP/SM
Saturated Clay Materials	1 of 1	1.4	1.40	CL
Fill Materials	8 of 8	0.006–0.19	0.07	HF, SP

[a]Boring Location SO-066 sample depth 29–30 ft bgs is sample of silty clay till. Bulk density of 1.19 g/cm^3.
[b]Average TOC value is the geometric mean of the data with nondetects represented by one-half the detection limit.

TABLE 2-2
In Situ Hydraulic Test Result Summary
OMC Plant 2

Shallow Wells		Deep Wells	
Well ID	**Hydraulic Conductivity (cm/sec)**	**Well ID**	**Hydraulic Conductivity (cm/sec)**
MW-500S	7.32E-02	MW-500D	3.47E-03
MW-501S	1.55E-02	MW-501D	2.95E-03
MW-502S	1.39E-02	MW-502D	5.35E-03
MW-503S	6.13E-03	MW-503D	4.85E-03
MW-504S	3.55E-02	MW-504D	3.83E-03
MW-505S	1.75E-02	MW-505D	5.64E-03
MW-506S	4.73E-02	MW-506D	5.26E-03
MW-507S	1.18E-02	MW-507D	3.15E-03
MW-508S	2.18E-02	MW-508D	3.46E-03
MW-509S	1.63E-02	MW-509D	6.90E-03
MW-510S	1.07E-02	MW-510D	4.74E-03
MW-511S	2.59E-02	MW-511D	4.67E-03
MW-512S	1.15E-02	MW-512D	4.26E-03
MW-513S	9.59E-02	MW-513D	5.99E-03
MW-514S	3.28E-02	MW-514D	7.89E-03
MW-515S	1.10E-02	MW-515D	4.35E-03
MW-516S	7.11E-02	MW-516D	2.61E-03
MW-517S	1.12E-02	MW-517D	6.40E-03
Geometric Mean	**2.16E-02**	**Geometric Mean**	**4.56E-03**

TABLE 2-3
Vertical Hydraulic Gradients
OMC Plant 2

Location	Top of Casing Elevation (ft amsl)	Elevation Ground Surface (ft amsl)	Top of Screened Interval (ft bgs)	Bottom of Screened Interval (ft bgs)	Top of Screened Interval (ft amsl)	Bottom of Screened Interval (ft amsl)	Screen Midpoint Elevation (ft amsl)	Distance between Screen Midpoints	May 2005 Depth to Water (btoc)	May 2005 Total Depth (btoc)	May 2005 GW Elevation (ft amsl)	May 2005 vertical gradient*	Aquifer
MW-500D	586.19	583.65	20.50	25.50	563.15	558.15	560.65		4.02	27.12	582.17		Deep
MW-500S	586.18	583.71	1.50	6.50	582.21	577.21	579.71	19.06	4.03	9.07	582.15	0.001	Shallow
MW-501D	585.76	583.29	23.00	28.00	560.29	555.29	557.79		5.21	31.27	580.55		Deep
MW-501S	585.83	583.36	1.50	6.50	581.86	576.86	579.36	21.57	5.23	10.22	580.60	-0.002	Shallow
MW-502D	587.33	584.84	18.00	23.00	566.84	561.84	564.34		4.70	25.84	582.63		Deep
MW-502S	587.44	584.93	2.00	7.00	582.93	577.93	580.43	16.09	4.79	9.87	582.65	-0.001	Shallow
MW-503D	584.63	584.86	20.00	25.00	564.86	559.86	562.36		2.40	23.89	582.23		Deep
MW-503S	584.66	584.91	2.00	7.00	582.91	577.91	580.41	18.05	2.41	7.33	582.25	-0.001	Shallow
MW-504D	588.16	588.42	24.00	29.00	564.42	559.42	561.92		6.16	28.50	582.00		Deep
MW-504S	588.23	588.42	4.00	9.00	584.42	579.42	581.92	20.00	6.22	9.41	582.01	-0.0005	Shallow
MW-505D	587.97	588.36	22.00	27.00	566.36	561.36	563.86		5.52	25.42	582.45		Deep
MW-505S	588.13	588.36	4.00	9.00	584.36	579.36	581.86	18.00	5.68	8.78	582.45	0.000	Shallow
MW-506D	588.19	588.42	23.00	28.00	565.42	560.42	562.92		5.99	27.53	582.20		Deep
MW-506S	588.18	588.42	4.00	9.00	584.42	579.42	581.92	19.00	5.97	9.23	582.21	-0.001	Shallow
MW-507D	586.34	583.93	20.00	25.00	563.93	558.93	561.43		4.53	26.08	581.81		Deep
MW-507S	586.32	583.88	2.00	7.00	581.88	576.88	579.38	17.95	4.50	9.64	581.82	-0.001	Shallow
MW-508D	584.68	584.96	24.00	29.00	560.96	555.96	558.46		3.70	29.46	580.98		Deep
MW-508S	584.67	584.93	1.50	6.50	583.43	578.43	580.93	22.47	3.69	6.23	580.98	0.000	Shallow
MW-509D	584.19	584.41	14.50	19.50	569.91	564.91	567.41		1.99	19.38	582.20		Deep
MW-509S	584.22	584.42	2.00	7.00	582.42	577.42	579.92	12.51	1.21	6.46	583.01	-0.065	Shallow
MW-510D	588.07	588.33	22.00	27.00	566.33	561.33	563.83		5.95	27.28	582.12		Deep
MW-510S	588.05	588.33	4.00	9.00	584.33	579.33	581.83	18.00	5.97	9.23	582.08	0.002	Shallow
MW-511D	588.22	588.41	23.00	28.00	565.41	560.41	562.91		6.51	28.51	581.71		Deep
MW-511S	588.15	588.41	4.00	9.00	584.41	579.41	581.91	19.00	6.46	9.27	581.69	0.001	Shallow
MW-512D	584.60	584.86	20.00	25.00	564.86	559.86	562.36		3.09	25.53	581.51		Deep
MW-512S	584.56	584.83	2.50	7.50	582.33	577.33	579.83	17.47	3.06	7.34	581.50	0.001	Shallow
MW-513D	585.29	585.54	20.50	25.00	565.04	560.54	562.79		3.65	23.31	581.64		Deep
MW-513S	585.23	585.44	2.50	7.50	582.94	577.94	580.44	17.65	3.60	7.21	581.63	0.001	Shallow
MW-514D	584.70	584.92	20.00	25.00	564.92	559.92	562.42		3.45	24.90	581.25		Deep
MW-514S	584.70	584.70	2.50	7.50	582.20	577.20	579.70	17.28	3.45	6.93	581.25	0.000	Shallow
MW-515D	583.90	583.88	21.00	26.00	562.88	557.88	560.38		2.34	26.23	581.56		Deep
MW-515S	583.71	583.97	3.00	8.00	580.97	575.97	578.47	18.09	2.47	7.90	581.24	0.018	Shallow
MW-516D	583.78	584.04	20.00	25.00	564.04	559.04	561.54		3.77	25.41	580.01		Deep
MW-516S	583.80	584.08	3.00	8.00	581.08	576.08	578.58	17.04	3.75	8.23	580.05	-0.002	Shallow
MW-517D	586.64	584.19	15.00	20.00	569.19	564.19	566.69		4.21	22.53	582.43		Deep
MW-517S	586.64	584.18	2.50	7.50	581.68	576.68	579.18	12.49	4.26	9.75	582.38	0.004	Shallow

Notes.
Survey coordinates are NAD 1983 State Plane Illinois East FIPS 1201 Feet
ft amsl = feet above mean sea level
ft btoc = feet below top of casing
*Negative value for vertical gradient denotes downward direction

TABLE 3-1
Storm Sewer Sediment Sampling Summary
OMC Plant 2

Storm Sewer Manhole ID	Sediment Thickness (inches)	Water Present in Manhole?	Sheen Observed During Sampling?	Total PCBs (mg/kg)
1662	8.0	Yes	Yes	130
1663	30.0	Yes	Yes	3.1
1861	4.0	Yes	No	2.8
1913	4.0	Yes	No	0.9
7	24.0	Yes	Yes	3.0
8	6.0	No	N/A	0.2
9	6.0	Yes	Yes	1.9

Aroclor 1248 was the only PCB aroclor detected in samples.
N/A - not applicable due to absence of water in manhole during sampling.

TABLE 3-2
Frequency of Compounds Detected in Soil Samples
OMC Plant 2

Analyte	Units	Number of Samples	Number of Detects	Minimum Detected Concentration	Maximum Detected Concentration	TACO Tier 1 Soil Remediation Objectives for Residential Properties	TACO Tier 1 Soil Remediation Objectives for Groundwater Ingestion
PCBs							
PCB-1232 (Arochlor 1232)	µg/kg	135	1	32,000	32,000	1,000	NE
PCB-1242 (Arochlor 1242)	µg/kg	134	3	4,500	480,000	1,000	NE
PCB-1248 (Arochlor 1248)	µg/kg	135	94	11	790,000	1,000	NE
PCB-1254 (Arochlor 1254)	µg/kg	135	50	8	190,000	1,000	NE
PCB-1260 (Arochlor 1260)	µg/kg	135	44	26	210,000	1,000	NE
Metals							
Aluminum (fume or dust)	mg/Kg	15	15	620	1,300	NE	NE
Arsenic	mg/Kg	15	15	0.77	5.4	750	0.05 mg/L[a]
Barium	mg/Kg	15	15	2.7	7.1	5,500	2.0 mg/L[a]
Beryllium	mg/Kg	15	15	0.078	0.4	160	0.004 mg/L[a]
Cadmium	mg/Kg	15	8	0.11	0.17	78	0.05 mg/L[a]
Calcium Metal	mg/Kg	15	15	12,000	31,000	NE	NE
Chromium, Total	mg/Kg	15	15	2.4	10	230	0.1 mg/L[a]
Cobalt	mg/Kg	15	14	0.95	1.8	4,700	1.0 mg/L[a]
Copper	mg/Kg	15	15	1.4	4.6	2,900	0.65 mg/L[a]
Iron	mg/Kg	15	15	2,500	4,800	NE	5.0 mg/L[a]
Lead	mg/Kg	15	15	1.8	11	400	0.0075 mg/L[a]
Magnesium	mg/Kg	15	15	6,100	16,000	NE	NE
Manganese	mg/Kg	15	15	75	270	3,700	0.15 mg/L[a]
Mercury	mg/Kg	15	7	0.0056	0.0087	10	0.002 mg/L[a]
Nickel	mg/Kg	15	14	2	4.1	1600	0.1 mg/L[a]
Potassium	mg/Kg	15	14	94	220	NE	NE
Sodium	mg/Kg	15	14	98	200	NE	NE
Vanadium (fume or dust)	mg/Kg	15	15	5.3	13	550	0.049 mg/L[a]
Zinc	mg/Kg	15	15	10	28.4	23,000	5.0 mg/L[a]
Semivolatile Organic Compounds							
Chrysene	µg/kg	135	72	36	63,000	88,000	160,000
2,4-Dimethylphenol	µg/kg	135	2	68	89	1,600,000	9,000
2-Methylnaphthalene	µg/kg	135	15	43	3,000	NE	NE
3,3'-Dichlorobenzidine	µg/kg	135	1	81	81	1,000	7
4-Chloro-3-Methylphenol	µg/kg	135	1	63	63	NE	NE
4-Methylphenol (p-Cresol)	µg/kg	135	3	79	110	NE	NE
Acenaphthene	µg/kg	135	27	42	19,000	4,700,000	570,000
Acenaphthylene	µg/kg	135	8	15	2,100	NE	NE
Acetophenone	µg/kg	135	16	40	170	NE	NE
Anthracene	µg/kg	135	39	13	17,000	23,000,000	12,000,000
Benzaldehyde	µg/kg	135	3	38	45	NE	NE
Benzo(a)anthracene	µg/kg	135	63	25	47,000	900	2,000
Benzo(a)pyrene	µg/kg	135	64	27	40,000	90	8,000
Benzo(b)fluoranthene	µg/kg	135	64	40	51,000	900	5,000
Benzo(g,h,i)perylene	µg/kg	135	57	36	32,000	NE	NE
Benzo(k)fluoranthene	µg/kg	135	54	38	29,000	9,000	49,000
Benzyl butyl phthalate	µg/kg	135	1	130	130	930,000	930,000
Biphenyl (diphenyl)	µg/kg	135	6	51	1500	NE	NE
bis(2-Ethylhexyl) phthalate	µg/kg	135	31	36	3100	46,000	3,600,000
Caprolactam	µg/kg	135	4	41	210	NE	NE
Carbazole	µg/kg	135	31	39	17,000	32,000	600
Dibenz(a,h)anthracene	µg/kg	135	38	39	13,000	90	2,000
Dibenzofuran	µg/kg	135	23	46	16,000	NE	NE
Diethyl phthalate	µg/kg	135	3	49	290	2,000,000	470,000
Di-n-butyl phthalate	µg/kg	135	14	40	390	2,300,000	2,300,000

TABLE 3-2
Frequency of Compounds Detected in Soil Samples
OMC Plant 2

Analyte	Units	Number of Samples	Number of Detects	Minimum Detected Concentration	Maximum Detected Concentration	TACO Tier 1 Soil Remediation Objectives for Residential Properties	TACO Tier 1 Soil Remediation Objectives for Groundwater Ingestion
Di-n-octylphthalate	µg/kg	135	3	21,000	73,000	1,600,000	10,000,000
Fluoranthene	µg/kg	135	71	40	150,000	3,100,000	21,000,000
Fluorene	µg/kg	135	26	42	17,000	3,100,000	2,800,000
Hexachlorobenzene	µg/kg	135	2	59	230	400	11,000
Indeno(1,2,3-c,d)pyrene	µg/kg	135	60	38	27,000	900	14,000
Naphthalene	µg/kg	135	15	62	5,100	170,000	12,000
N-nitrosodi-n-propylamine	µg/kg	135	1	130	130	90	0.05
N-nitrosodiphenylamine	µg/kg	135	2	48	250	130,000	1,000
Phenanthrene	µg/kg	135	61	38	200,000	NE	NE
Phenol	µg/kg	135	7	39	20,000	47,000,000	100,000
Pyrene	µg/kg	135	77	40	140,000	2,300,000	4,200,000
Volatile Organic Compounds							
1,1,1-Trichloroethane	µg/kg	146	7	5	16,000	1,200,000	2,000
1,1-Dichloroethane	µg/kg	146	3	4	530	1,300,000	23,000
1,1-Dichloroethylene	µg/kg	146	4	5	1,300	700,000	60
1,2,4-Trichlorobenzene	µg/kg	146	2	2	29	780,000	5,000
1,2-Dichlorobenzene	µg/kg	146	1	2	2	560,000	17,000
1,4-Dichlorobenzene	µg/kg	146	3	2	3	11,000,000	2,000
Acetone	µg/kg	146	15	3	54	7,800,000	16,000
Benzene	µg/kg	146	1	15	15	800	30
Carbon disulfide	µg/kg	146	18	2	29	720,000	32,000
Carbon tetrachloride	µg/kg	146	2	6	2,300	300	70
Chloroethane	µg/kg	146	2	4	27	NE	NE
Chloroform	µg/kg	146	5	2	460	300	600
cis-1,2-Dichloroethylene	µg/kg	146	38	3	66,000	780,000	400
Cyclohexane	µg/kg	146	2	3	7	NE	NE
Methylene chloride	µg/kg	146	27	2	380	13,000	20
Ethylbenzene	µg/kg	146	5	10	530	400,000	13,000
Isopropylbenzene (cumene)	µg/kg	146	5	2	14	NE	NE
1,3-Dichlorobenzene	µg/kg	146	3	3	6	NE	NE
2-Butanone	µg/kg	146	7	3	10	NE	NE
Methyl isobutyl ketone (4-methyl-2-pentanone)	µg/kg	146	1	12	12	NE	NE
2-Hexanone	µg/kg	146	1	3	3	NE	NE
Toluene	µg/kg	146	6	4	460	650,000	12,000
Methylcyclohexane	µg/kg	146	3	4	44	NE	NE
Tetrachloroethylene (PCE)	µg/kg	146	4	12	1900	11,000	60
trans-1,2-Dichloroethene	µg/kg	146	16	3	250	1,600,000	700
Trichloroethylene	µg/kg	146	50	2	1,300,000	5,000	60
Vinyl chloride	µg/kg	146	9	4	190	280	10
Xylenes, Total	µg/kg	146	8	3	2,300	1,390,000	600,000

Notes:
NE indicates a TACO remediation objective has not been established for this contaminant.
[a]Values listed are to be compared with SPLP or TCLP test results

TABLE 3-3
Frequency of Compounds Detected in Groundwater Samples
OMC Plant 2

Analyte	Units	Number of Samples	Number of Detects	Minimum Detected Concentration	Maximum Detected Concentratio n	TACO Tier 1 Groundwater Remediation Objectives for Class I Aquifers
Metals						
Aluminum (fume or dust)	µg/L	127	33	13.3	831	
Arsenic	µg/L	127	42	5	1430	50
Barium	µg/L	127	33	108	751	2000
Calcium Metal	µg/L	127	127	12,800	395,000	
Chromium, Total	µg/L	127	10	0.87	9.4	100
Cobalt	µg/L	127	15	0.7	4.2	1,000
Copper	µg/L	127	17	1.6	41.1	650
Cyanide	µg/L	62	33	1	1,020	200
Iron	µg/L	127	118	9.1	50,500	5,000
Lead	µg/L	127	1	4	4	7.5
Magnesium	µg/L	127	127	10,800	136,000	
Manganese	µg/L	127	125	33	1,100	150
Mercury	µg/L	127	1	0.066	0.066	2
Nickel	µg/L	127	25	1.9	15.1	100
Potassium	µg/L	127	127	658	20,500	
Selenium	µg/L	127	3	7.9	10.7	50
Sodium	µg/L	127	127	5,060	637,000	
Vanadium (fume or dust)	µg/L	127	34	0.63	25.7	49
Zinc	µg/L	127	65	2.4	174	5,000
PCBs						0
PCB-1016 (Arochlor 1016)	µg/L	62	3	0.19	14	0.5
PCB-1232 (Arochlor 1232)	µg/L	62	1	110	110	0.5
PCB-1248 (Arochlor 1248)	µg/L	62	4	0.18	61	0.5
PCB-1254 (Arochlor 1254)	µg/L	62	1	1.5	1.5	0.5
Semivolatile Organic Compounds						0
2,4-Dimethylphenol	µg/L	62	5	2.9	3,000	140
2-Methylphenol (o-Cresol)	µg/L	62	2	1,000	2,300	350
4-Methylphenol (p-Cresol)	µg/L	62	9	2.9	50,000	
Acenaphthene	µg/L	62	1	9.5	9.5	420
Acetophenone	µg/L	62	1	1.4	1.4	
Anthracene	µg/L	62	1	2.6	2.6	2,100
Dibenzofuran	µg/L	62	1	2.7	2.7	
Di-n-butyl phthalate	µg/L	62	18	0.51	1.5	700
Fluoranthene	µg/L	62	1	5.5	5.5	280
Fluorene	µg/L	62	1	7.6	7.6	280
Pentachlorophenol	µg/L	62	1	0.96	0.96	1
Phenanthrene	µg/L	62	1	29	29	
Phenol	µg/L	62	2	4.5	140	100
Pyrene	µg/L	62	1	3.1	3.1	210
Volatile Organic Compounds						
1,1,1-Trichloroethane	µg/L	93	2	2.3	2,900	200
1,1,2-Trichloro-1,2,	µg/L	92	1	160	160	
1,1,2-Trichloroethane	µg/L	93	1	0.34	0.34	5
1,1-Dichloroethane	µg/L	93	45	0.065	480	700
1,1-Dichloroethylene	µg/L	93	30	0.12	480	7

TABLE 3-3
Frequency of Compounds Detected in Groundwater Samples
OMC Plant 2

Analyte	Units	Number of Samples	Number of Detects	Minimum Detected Concentration	Maximum Detected Concentration	TACO Tier 1 Groundwater Remediation Objectives for Class I Aquifers
1,2,4-Trichlorobenzene	µg/L	92	1	160	160	
1,2-Dichloroethane	µg/L	93	10	0.062	0.87	5
1,3-Dichlorobenzene	µg/L	92	4	0.09	0.81	
1,4-Dichlorobenzene	µg/L	92	3	0.07	110	75
2-Butanone	µg/L	93	2	0.37	1.6	
2-Hexanone	µg/L	93	1	0.49	0.49	
Acetone	µg/L	93	15	1.8	33	700
Benzene	µg/L	93	45	0.031	410	5
Bromodichloromethane	µg/L	93	2	0.13	0.15	0.2
Bromoform	µg/L	93	4	0.83	270	1
Carbon Disulfide	µg/L	93	23	0.081	1.7	700
Chloroethane	µg/L	93	7	0.24	110	
Chloroform	µg/L	93	20	0.048	140	0.2
Chloromethane	µg/L	93	2	0.17	4.1	
cis-1,2-Dichloroethylene	µg/L	92	74	0.11	280,000	70
Cyclohexane	µg/L	92	8	0.11	0.36	
Dibromochloromethane	µg/L	93	2	0.065	0.079	
Ethylbenzene	µg/L	93	5	0.11	0.45	700
Methyl Acetate	µg/L	92	1	7.2	7.2	
Methylcyclohexane	µg/L	92	22	0.087	0.28	
Methylene Chloride	µg/L	93	8	0.17	170	5
Tetrachloroethylene(PCE)	µg/L	93	2	0.43	110	5
Toluene	µg/L	93	33	0.03	75	1,000
Trans-1,2-Dichloroethene	*µg/L*	*92*	*54*	*0.08*	*500*	*100*
Trichloroethylene	µg/L	93	48	0.06	16,000	5
Vinyl Chloride	µg/L	93	66	0.32	16,000	2
Xylenes, Total	µg/L	93	6	0.07	4	10,000

NE indicates a TACO remediation objective has not been established for this contaminant.

TABLE 4-1
Selected Representative Chemicals
OMC Plant 2

Chemical Category	Representative Chemicals[a]
PCBs	Aroclor 1248
CVOCs	TCE cis-1,2-dichloroethene Vinyl chloride
CPAHs	Benzo(a)pyrene

[a]The chemicals listed were selected from the overall list of plant-related chemicals based on concentration, frequency of occurrence, migration potential, and carcinogenic potential

TABLE 4-2
Important Physical/Chemical and Environmental Fate Parameters
OMC Plant 2

Parameter	Definition
Molecular Weight	The molecular weight of a pure compound influences other physical characteristics of a compound. For example, organic compounds with higher molecular weights have a lower tendency to volatilize than those with lower molecular weights.
Water Solubility	Water solubility is the maximum mass of a compound that can dissolve in a specific volume of water at a specific pH, and temperature. Highly soluble compounds tend to be more mobile in groundwater, tend to leach from the soils, and are generally more biodegradable. In addition, the lower the solubility, the more likely the compound is to adsorb to soil. Aqueous concentrations in excess of the solubility may indicate sorption onto soil, the presence of solubilizing chemicals such as solvents, or the presence of a NAPL
Specific Gravity	Specific gravity and solubility of liquid compounds are among the primary physical properties that affect the transport of separate phase liquids in water. The density of relatively insoluble compound present as separate phase will determine whether it will sink or float in the saturated zone.
Vapor Pressure	Vapor pressure is a relative measure of volatility of a compound in its pure state. Compounds with relatively high vapor pressures readily volatilize from the liquid form.
Henry's Law Constant	Henry's Law Constant describes the distribution of a chemical between air and water at equilibrium. It is usually defined as the ratio of the spatial pressure of the compound in air, measured in atmospheres, to the mole fraction of the compound in a water solution. A high Henry's Law constant indicates a tendency of a compound to volatilize rather than remain in water. $< 10^{-7}$ low volatility 10^{-7} to 10^{-5} volatilize slowly $> 10^{-5}$ volatilization is significant
K_{ow}	The octanol-water partitioning coefficient, K_{ow} is a function of a compound's water solubility and the capacity of the compound to sorb on organic material. The K_{ow} is calculated experimentally by measuring the distribution of an organic chemical between octanol and water in contact with each other at equilibrium conditions. Compounds with high K_{ow} tend to avoid the aqueous phase and may remain sorbed on soils longer. Compounds with high K_{ow} also tend to bioaccumulate in the lipid tissues of animals. Compounds with low coefficients tend to move in the aqueous phase, do not have the propensity to bioaccumulate, and are considered mobile and transitory in the groundwater.
K_{oc}	The soil organic carbon/water partitioning coefficient, K_{oc} is indicative of a compound's water solubility and the sorptive capacity of the compound onto organic material at equilibrium. The higher the K_{oc}, the more likely a chemical is to bind to soil than to remain in water. The K_{oc} is calculated experimentally and expressed as the ratio of the sorbed concentration versus the aqueous concentration. The following is a classification scheme for mobility of organic contaminants based on K_{oc} (Dragun 1998): < 50 very mobile 50 to 150 mobile 150 to 500 intermediate mobility 500 to 2,000 low mobility > 2,000 immobile

TABLE 4-2
Important Physical/Chemical and Environmental Fate Parameters
OMC Plant 2

Parameter	Definition
K_d	The distribution coefficient, K_d is a soil-specific measure of the extent of chemical partitioning between the soil and the water. The extent of sorption can be reasonably calculated if the organic carbon content in the soil (f_{oc}) is known by using $K_d = K_{oc} \times f_{oc}$. The higher the K_d, the more likely a chemical is to bind to soil than to remain in water.
Hydrolysis	Hydrolysis is a substitution reaction in which an organic molecule reacts with water or a component ion of water and a halogen substituent (e.g., chlorine) is replaced with a hydroxyl (OH^-) group.
Photolysis	An abiotic process that can decompose organic compounds by exposure to light and the atmosphere.
Biodegradation	Biodegradation is the biological decomposition of chemical alteration of organic compound by microorganisms.

TABLE 4-3
Chemical and Physical Properties of Representative Chemicals
OMC Plant 2

Chemical	Water Solubility[a] (mg/L)	Vapor Pressure[b] (mm Hg)	Molecular Weight (g/mole)	Specific Gravity	Log K_{ow}	K_{oc}[c] (mL/g)	Henry's Law Constant[d] (atm-m^3/mol)
PCBs[e]	0.7	4.9×10^{-4}	327 [avg][f]	1.5@ 15°C[f]	6.7	4.1×10^{5} [f]	2.6×10^{-3}
TCE	1,500	73	130	1.5 @ 20°C	2.4	166	1.0×10^{-2}
cis-1,2-DCE	3,500	200	97	1.3 @ 20°C	1.9	35.5	4.1×10^{-3}
Vinyl chloride	8,800	3,000	63	0.91@ 20°C	1.4	18.6	2.7×10^{-2}
Benzo(a)pyrene	0.0016	5.5×10^{-9}	250	1.35 [UT][f]	6.0	1.0×10^{6}	1.1×10^{-6}

Note:
All data were obtained from USEPA's Superfund Chemical Data Matrix (SCDM), January 2004 (@ http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm), unless otherwise indicated.
[UT] = Reference temperature is unspecified
[a]Water Solubility in mg/L at 25°C
[b]Vapor Pressure in mm Hg at 25°C
[c]Values from USEPA's *Supplemental Guidance for Developing Soil Screening levels for Superfund Sites* (December 2002), unless otherwise indicated
[d]Herny's Law constant measured at 25°C
[e]Chemical properties for PCBs in SCDM based on Aroclor 1254
[f]Data from the *Groundwater Chemicals Desk Reference* (Montgomery and Welkom 1989)

TABLE 4-4
Half-Lives for Representative Organic Compounds
OMC Plant 2

	Half-Lives (days)			
	Soil and Groundwater		Surface Water	Air
Chemical	Aerobic	Anaerobic	Photolysis	Photo-oxidation
PCBs	No data	No data	No data	No data
TCE	180–360	98–1,653	No data	1–11
1,2-DCE	28–180	98–1,653	No data	1–12
Vinyl chloride	28–180	112–720	No data	0.4–4
Benzo(a)pyrene	57–529	228–2,117	0.02–0.05	0.02–0.2

Source: Howard et al (1991)

TABLE 4-5
Chemical and Physical Properties of Some Aroclors
OMC Plant 2

Aroclor	Avg. Formula Weight (g/mole)	Density	Water Solubility[a] (mg/L)	Vapor Pressure[b] (mm Hg)	Log K_{ow}	K_{oc}[c] (mL/g)	Henry's Law Constant[d] (atm-m^3/mol)
1016	257.9	1.37	0.42	4×10^{-4}	5.6	5.4×10^{4}	2.9×10^{-4}
1221	200.7	1.18	0.59 @ 24°C	6.7×10^{-3}	4.7	2.8×10^{2}	3.5×10^{-3}
1232	232.2	1.26	0.45	4.06×10^{-3}	5.1	6.8×10^{2}	8.6×10^{-4} [c]
1242	266.5	1.38	0.34	4.06×10^{-4}	5.6	5.1×10^{3}	5.2×10^{-4}
1248[c]	261	1.41	0.060 @ 24°C	4.94×10^{-4}	6.1	4.4×10^{5}	5.6×10^{-4}
1254	328	1.54	0.057 @ 24°C	7.71×10^{-5}	6.5	4.1×10^{5}	2.0×10^{-3}
1260	357.7	1.62	0.08 @ 24°C	4.05×10^{-5}	5.8	2.6×10^{6}	4.6×10^{-3}
1262	389	1.64	0.052 @ 24°C	No data	No data	No data	No data
1268	453	1.81	0.3 @ 24°C	No data	No data	No data	No data

Note:
All data were obtained from ATSDR's *Toxicological profile for Polychlorinated Biphenyls (PCBs)* (November 2000), unless otherwise indicated.
[a]Water Solubility in mg/L at 25°C, unless specified
[b]Vapor Pressure in mm Hg at 25°C
[c]Data from *Groundwater Chemicals Desk Reference* (Montgomery and Welkom, 1989)
[d]Henry's Law constant measured at 25°C

TABLE 4-6
Estimated Contaminant Velocities
OMC Plant 2

Soil Matrix Data:		
p_b - soil density	1.74 g/cm^3	1.74 g/cm^3
n - total porosity [1-p_b/2.65]	0.34	0.34
n_e - effective porosity [= moisture content]	0.30	0.30
f_{oc} - fraction organic content [1000 ppm = 0.001]	970 ppm	0.00097 g/g
Aquifer Data:		
i- hydraulic gradient	0.001 ft/ft	0.001
K- hydraulic conductivity	56.7 ft/d	20696 ft/y
q - darcy velocity [K x i]	0.0567 ft/d	21 ft/y
v_x - average linear groundwater velocity [q/n_e]	0.189 ft/d	69 ft/y

Contaminant Specific Data	Contaminants				
	Aroclor 1248	TCE	cis-1,2-DCE	Vinyl chloride	Benzo(a)pyrene
K_{oc} (mL/g)	440,000	166	36	19	1,000,000
K_d (ml/g) [K_{oc} * f_{oc}]	426.8	0.16	0.034	0.018	6.7
R [1+$p_b$$K_d$/n]	2164	1.82	1.17	1.09	35
Contaminant Velocity					
v_c [v_x/R] (ft/y)	0.03	38	59	63	2
Distance Traveled in 100 yrs					
D [v_c * 100 y] (ft)	3	3,799	5,874	6,321	197
Time to Travel 50 feet					
t [50 ft/v_c] (y)	1568	1.3	0.9	0.8	25

TABLE 4-7
Estimated Times to Reach TACO Tier 1 Objectives
OMC Plant 2

Compound	Anaerobic Half-Life[a] (days)		Degradation Rate[b] (day^{-1})		Maximum Concentration[c] (mg/L)	Target Level[d] (mg/L)	Estimated Time[e] (years)	
	Minimum	Maximum	Minimum	Maximum			Minimum	Maximum
TCE	98	1,653	0.007	0.00042	16	0.005	3	53
Cis-1,2-DCE	98	1,653	0.0071	0.0004	280	0.07	3	54
Vinyl Chloride	112	720	0.0062	0.0010	16	0.002	4	26

[a] Howard et al. 1991

[b] Degradation rate = -ln(0.5)/half-life (based on first order decay)

[c] Maximum concentration detected in groundwater samples (Table 3-2).

[d] Target value = TACO Tier 1 Groundwater Remediation Objectives for Class I Aquifers

[e] Estimated time = -[ln(target value/maximum concentration)/degradation rate] (based on first order decay)

TABLE 4-8
Site Parameters to Screen for Anaerobic Biodegradation Processes in the Shallow and Deep Aquife
OMC Plant 2

Analysis	Preferred Concentration Indicating Anaerobic Biodegradation[4]	Non-Elevated VOC Area[1] Frequency of Detection	Range in Concentration (mg/L)		Highest VOC Area in Shallow[2] Frequency of Detection	Range in Concentration (mg/L)		Number of Samples in Preferred Range	Highest VOC Area in Deep[3] Frequency of Detection	Range in Concentration (mg/L)		Number of Samples in Preferred Range
Oxygen (mg/L)	< 0.5 mg/L	26/26	0.25	2.06	5/5	0.37	8.5	3	5/5	0.19	3.1	3
Nitrate (mg/L)	< 1 mg/L	9/26	ND[5]	1.1	4/5	ND[5]	0.94	4	0/5	ND[5]	ND[5]	0
Iron II (mg/L)	> 1 mg/L	25/26	ND[5]	8.32	2/5	ND[5]	32	2	5/5	0.172	50.1	2
Sulfate (mg/L)	< 20 mg/L	26/26	0.76	300	5/5	19	140	1	5/5	3	1100	2
Sulfide (mg/L)	> 1 mg/L	3/26	1.6	4.6	0/5	ND[5]	ND[5]	0	0/5	ND[5]	ND[5]	0
Methane (mg/L)	> 0.5 mg/L	26/26	0.005	8.2	5/5	0.043	4.1	4	5/5	0.130	3.3	4
Oxidation Reduction Potential[4] (mV)	< -100 mV	26/26	-218	221.6	5/5	-44.1	162.8	0	5/5	-26.3	-75.9	0
pH	5 < pH < 9	26/26	6.57	7.51	5/5	6.46	7.09	5	5/5	6.50	7.18	5
TOC (mg/L)	> 20 mg/L	26/26	1.2	160	5/5	2.1	40	1	5/5	4.4	16	0
Temperature (degrees Celsius)	> 20C	26/26	8.89	13.2	5/5	8.90	12.03	0	5/5	10.71	12.61	0
Alkalinity (mg/L)	> 2x background	26/26	190	2300	5/5	340	470	0	5/5	360	490	0
Chloride (mg/L)	> 2x background	26/26	6.5	1900	5/5	11	140	0	5/5	150	490	0
BTEX[9] (mg/L)	> 0.1 mg/L	19/26	ND[5]	0.485	3/5[10]	ND[5]	0.051	0	2/5[10]	ND[5]	0.0026	0
Tetrachloroethene (mg/L)	NA[6]	0/26	ND[5]	ND[5]	0/5	ND[5]	ND[5]	0	0/5	ND[5]	ND[5]	NA[7]
Trichloroethene (mg/L)	NA[6]	0/26	ND[5]	ND[5]	4/5	ND[5]	0.970	NA[7]	5/5	0.0027	0.810	NA[7]
cis-1,2-dichloroethene (mg/L)	NA[6]	16/26	ND[5]	4.4	5/5	0.15	51.0	NA[7]	5/5	0.020	250.0	NA[7]
trans-1,2-dichloroethene (mg/L)	NA[6]	9/26	ND[5]	0.024	5/5	0.0033	0.130	NA[7]	5/5	0.00019	0.460	NA[7]
Vinyl chloride (mg/L)	NA[6]	12/26	ND[5]	2	5/5	0.02	10	NA[7]	5/5	0.068	12	NA[7]
1,1,1-trichloroethane (mg/L)	NA[6]	0/26	ND[5]	ND[5]	1/5	ND[5]	2.9	NA[7]	0/5	ND[5]	ND[5]	NA[7]
1,1-dichloroethane (mg/L)	NA[6]	10/26	ND[5]	0.3	1/5	ND[5]	0.480	NA[7]	0/5	ND[5]	ND[5]	NA[7]
Chloroethane (mg/L)	NA[6]	1/26	ND[5]	0.0013	0/5	ND[5]	ND[5]	NA[7]	0/5	ND[5]	ND[5]	NA[7]
Ethene (mg/L)	> 0.01 mg/L	6/26	ND[5]	0.11	3/5	ND[5]	0.290	3	4/5	ND[5]	0.260	4
Ethane (mg/L)	> 0.01 mg/L	10/26	ND[5]	0.05	5/5	0.0026	0.250	2	4/5	ND[5]	0.049	2

[1] Results from shallow and deep monitoring wells (or nested monitoring wells) where TCE was not detected. Monitoring wells MW-500, MW-507, MW-508, MW-513, MW-515, MW-516, W-3, W-4, W-5, W-6, W-7, W-9, W-11, W-12, MW-3, MW-14, MW-100, and MW-101.
[2] Results from monitoring wells MW-503S, MW-504S, MW-511S, MW-512S, MW-514S
[3] Results from monitoring wells MW-503D, MW-504D, MW-511D, MW-512D, MW-514D
[4] See Table 2.3 in *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* . EPA/600/R-98/128
[5] ND = Not Detected
[7] NA = Not applicable.
[8] Background concentration based on upgradient monitoring well W-11 alkalinity = 370 mg/L and chloride 230 mg/L
[9] BETX concentration is the sum of the detected concentrations only.

Table 4-9
Site Parameters to Screen for Anaerobic Biodegradation Processes in the Shallow and Deep Aquife
OMC Plant 2

Analysis	Preferred Concentration Indicating Anaerobic Biodegradation[1]	Interpretation[1]	Value[1]	Points Awarded for Shallow Aquifer[1,2]	Points Awarded for Deep Aquifer[1,2]
Oxygen (mg/L)	< 0.5 mg/L	Tolerated, suppresses the reductive pathway at higher concentrations.	3	3	3
Oxygen (mg/L)	> 5 mg/L	Not tolerated, however, VC may be oxidized aerobically.	-3	0	0
Nitrate (mg/L)	< 1 mg/L	At higher concentrations, may compete with reductive pathway.	2	2	2
Iron II	> 1 mg/L	Reductive pathway possible; VC may be oxidized under Fe (III)-reducing conditions.	3		
Sulfate (mg/L)	< 20 mg/L	At higher concentrations, may compete with reductive pathway.	2	0	0
Sulfide (mg/L)	> 1 mg/L	Reductive pathway possible.	3	0	0
Methane (mg/L)	< 0.5 mg/L	VC oxidizes.	0	0	0
Methane (mg/L)	> 0.5 mg/L	Ultimate reductive daughter product, VC accumulates.	3	3	3
Oxidation Reduction Potential (mV)	< 50 mV	Reductive pathway possible.	1	0	0
Oxidation Reduction Potential (mV)	< -100 mV	Reductive pathway likely.	2	0	0
pH	5 < pH < 9	Optimal range for reductive pathway.	0	0	0
pH	5 > pH > 9	Outside optimal range for reductive pathway.	-2	0	0
TOC (mg/L)	> 20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic.	2	0	0
Temperature (degrees Celsius)	> 20C	At T .20C, biochemical process is accelerated.	1	0	0
Alkalinity (mg/L)	> 2x background	Results from interaction between CO_2 and aquifer materials.	1	0	0
Chloride (mg/L)	> 2x background	Daughter product of organic chlorine.	2	0	0
BTEX (mg/L)	> 0.1 mg/L	Carbon and energy source; drives dechlorination.	2	0	0
Tetrachloroethene (mg/L)	NA	Material released.	0	0	0
Trichloroethene (mg/L)	NA	Material released.	0	0	0
Trichloroethene (mg/L)	NA	Daughter product of PCE.	2	0	0
Dichloroethene (mg/L)	NA	Daughter product of TCE; If cis is > 80% of total DCE it is likely a daughter product. 1,1DCE can be chemical reaction product of TCA.	2	2	2
Vinyl chloride (mg/L)	NA	Daughter product of DCE.	2	2	2
1,1,1-trichloroethane (mg/L)	NA	Material released.	0	0	0
1,1-dichloroethane (mg/L)	NA	Daughter product of TCA under reducing conditions.	2	0	0
Chloroethane (mg/L)	NA	Daughter product of DCA or VC under reducing conditions.	2	0	0
Ethene/Ethane (mg/L)	> 0.01 mg/L	Daughter product of VC/ethene.	2	2	2
Ethene/Ethane (mg/L)	> 0.1 mg/L	Daughter product of VC/ethene.	3	0	2
			SCORE:	**14**	**16**
			INTERPRETATION (6 to 14):	**LIMITED EVIDENCE FOR ANAEROBIC BIODEGRADATION OF CHLORINATED ORGANICS**	
			INTERPRETATION (15 to 20):	**ADEQUATE EVIDENCE FOR ANAEROBIC BIODEGRADATION OF CHLORINATED ORGANICS**	

[1] See Table 2.3 in *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* , EPA/600/R-98/128.
[2] Points awarded only when 50 percent or more of results for a particular parameter for the wells indicated were at the preferred concentration.
NA = Not applicable.

TABLE 5-1

Comparison of Detected Constituents in Soil with Risk Based Remediation Objectives[a]—Residential Scenario

OMC Plant 2

Chemical	CAS Number	Maximum Detection	Sample Qualifier	Units	Location of Maximum Detection	Sample Beginning Depth (feet bgs)	Sample Ending Depth (feet bgs)	EPA Region 9 Soil Direct Contact PRG (mg/kg)	Tier 1 TACO Residential Soil Value (mg/kg)		Criteria Exceeded
Volatile Organic Compounds (VOCs)									Ingestion	Inhalation	
Benzene	71-43-2	0.02		mg/kg	SO030	0	0.5	0.643	12.0	0.800	-
Carbon disulfide	75-15-0	0.00	J	mg/kg	SO031	0	0.5	355	7800	720	-
Methylene chloride	75-09-2	0.01	J	mg/kg	SO030	0	0.5	9.11	85.0	13.0	-
Toluene	95-49-8	0.07		mg/kg	SO036	0	0.5	520	NA	NA	-
Trichloroethylene	79-01-6	0.04		mg/kg	SO033	0	0.5	0.0530	58.0	5.00	-
Semivolatile Organic Compounds (SVOCs)											
2-Methylnaphthalene	91-57-6	3.00	J	mg/kg	SO035	0	0.5	313	NA	NA	(b)
Acenaphthene	83-32-9	19.00		mg/kg	SO035	0	0.5	3682	4700	NA	-
Acetophenone	98-86-2	0.13		mg/kg	SO054	0	0.5	NA	NA	NA	(c)
Anthracene	120-12-7	17.00		mg/kg	SO035	0	0.5	21896	23000	NA	-
Benzo(a)anthracene	56-55-3	47.00		mg/kg	SO035	0	0.5	0.621	0.900	NA	TACO & EPA
Benzo(a)pyrene	50-32-8	40.00		mg/kg	SO035	0	0.5	0.062	0.090	NA	TACO & EPA
Benzo(b)fluoranthene	205-99-2	51.00		mg/kg	SO035	0	0.5	0.621	0.900	NA	TACO & EPA
Benzo(g,h,i)perylene	198-55-0	32.00	J	mg/kg	SO035	0	0.5	NA	NA	NA	(c)
Benzo(k)fluoranthene	207-08-9	29.00		mg/kg	SO035	0	0.5	6.21	9.00	NA	TACO & EPA
bis(2-Ethylhexyl) phthalate	117-81-7	3.10	J	mg/kg	SO-028	0	0.5	34.7	46.0	31000	-
Carbazole	86-74-8	17.00	J	mg/kg	SO035	0	0.5	24.3	32.0	NA	-
Dibenz(a,h)anthracene	53-70-3	13.00		mg/kg	SO035	0	0.5	0.0621	0.0900	NA	TACO & EPA
Dibenzofuran	132-64-9	16.00		mg/kg	SO035	0	0.5	145	NA	NA	-
Di-n-butyl phthalate	84-74-2	0.39	J	mg/kg	SO050	0	0.5	6110	7800	2300	-
Fluoranthene	206-44-0	150.00		mg/kg	SO035	0	0.5	2294	3100	NA	-
Fluorene	86-73-7	17.00		mg/kg	SO035	0	0.5	2747	3100	NA	-
Hexachlorobenzene	118-74-1	0.23	J	mg/kg	SO050	0	0.5	0.304	0.400	1.00	-
Indeno(1,2,3-c,d)pyrene	193-39-5	27.00		mg/kg	SO035	0	0.5	0.621	0.900	NA	TACO & EPA
Naphthalene	91-20-3	5.10	J	mg/kg	SO035	0	0.5	55.9	1600	NA	-
Phenanthrene	85-01-8	200.00		mg/kg	SO035	0	0.5	NA	NA	NA	(c)
Pyrene	129-00-0	140.00	J	mg/kg	SO035	0	0.5	2316	2300	NA	-
Pesticides/PCBs											
PCB-1248 (Arochlor 1248)	12672-29-6	3.70		mg/kg	SO034	0	0.5	0.319	1.00	NA	TACO & EPA (b)
PCB-1254 (Arochlor 1254)	11097-69-1	3.70		mg/kg	SO034	0	0.5	0.319	1.00	NA	TACO & EPA (b)
PCB-1260 (Arochlor 1260)	11096-82-5	0.35	J	mg/kg	SO034	0	0.5	0.319	1.00	NA	EPA (b)

J = Estimated value

NA = Not available or not applicable

TACO = Tier 1 Soil Remediation Objectives for Residential Properties - Appendix B, Table A (IEPA, 2001).

(b) = Region 9 PRG not available, Region 3 RBC used.

(c) = No listing in Region 9 PRGs or Region 3 RBCs.

TABLE 5-2
Comparison of Detected Constituents in Soil with Risk Based Remediation Objectives[a]—Construction Worker Scenario
OMC Plant 2

Chemical	CAS Number	Maximum Detection	Sample Qualifier	Units	Location of Maximum Detection	Sample Beginning Depth (feet bgs)	Sample Ending Depth (feet bgs)	EPA Region 9 Soil Direct Contact PRG (mg/kg)	Tier 1 TACO Construction Worker Soil Value (mg/kg)		Criteria Exceeded
Volatile Organic Compounds (VOCs)									Ingestion	Inhalation	
1,1,1-Trichloroethane	71-55-6	16.00		mg/kg	SO062	0.8	2.3	1200	NA	1200	-
Benzene	71-43-2	0.02		mg/kg	SO030	0	0.5	1.41	2300	2.20	-
Carbon disulfide	75-15-0	0.03	J	mg/kg	SO074	2.1	2.4	720	20000	9.00	-
Chloroform	67-66-3	0.46	J	mg/kg	SO062	0.8	2.3	0.470	2000	0.760	-
cis-1,2-Dichloroethylene	156-59-2	66.00		mg/kg	SO062	0.8	2.3	146	20000	1200	-
Methylene chloride	75-09-2	0.33		mg/kg	SO062	0.8	2.3	20.5	12000	34.0	-
trans-1,2-Dichloroethene	156-60-5	0.04	J	mg/kg	SO056	1.7	2.0	235	41000	3100	-
Trichloroethylene	79-01-6	100.00		mg/kg	SO070	3.3	4.5	0.115	1200	12.0	TACO & EPA
Semivolatile Organic Compounds (SVOCs)											
2-Methylnaphthalene	91-57-6	3.00	J	mg/kg	SO035	0	0.5	4088	NA	NA	(b)
Acenaphthene	83-32-9	19.00		mg/kg	SO035	0	0.5	29219	120000	NA	-
Acenaphthylene	208-96-8	0.53		mg/kg	SO034	0	0.5	NA	NA	NA	(c)
Acetophenone	98-86-2	0.13	J	mg/kg	SO034	0	0.5	102200	NA	NA	(b)
Anthracene	120-12-7	17.00		mg/kg	SO035	0	0.5	100000	610000	NA	-
Benzo(a)anthracene	56-55-3	47.00		mg/kg	SO035	0	0.5	2.11	170	NA	EPA
Benzo(a)pyrene	50-32-8	40.00		mg/kg	SO035	0	0.5	0.211	17.0	NA	TACO & EPA
Benzo(b)fluoranthene	205-99-2	51.00		mg/kg	SO035	0	0.5	2.11	170	NA	EPA
Benzo(g,h,i)perylene	198-55-0	32.00	J	mg/kg	SO035	0	0.5	NA	NA	NA	(c)
Benzo(k)fluoranthene	207-08-9	29.00		mg/kg	SO035	0	0.5	21.1	1700	NA	EPA
bis(2-Ethylhexyl) phthalate	117-81-7	3.10	J	mg/kg	SO-028	0	0.5	123	4100	31000	-
Caprolactam	105-60-2	0.21	J	mg/kg	SO018	2.8	3.3	100000	NA	NA	-
Carbazole	86-74-8	17.00	J	mg/kg	SO035	0	0.5	86.2	6200	NA	-
Dibenz(a,h)anthracene	53-70-3	13.00		mg/kg	SO035	0	0.5	0.211	17.0	NA	EPA
Dibenzofuran	132-64-9	16.00		mg/kg	SO035	0	0.5	1563	NA	NA	-
Di-n-butyl phthalate	84-74-2	0.39	J	mg/kg	SO050	0	0.5	61561	200000	2300	-
Fluoranthene	206-44-0	150.00		mg/kg	SO035	0	0.5	22000	82000	NA	-
Fluorene	86-73-7	17.00		mg/kg	SO035	0	0.5	26281	82000	NA	-
Indeno(1,2,3-c,d)pyrene	193-39-5	27.00		mg/kg	SO035	0	0.5	2.11	170	NA	EPA
Naphthalene	91-20-3	5.10	J	mg/kg	SO035	0	0.5	188	4100	1.800	TACO
Phenanthrene	85-01-8	200.00		mg/kg	SO035	0	0.5	NA	NA	NA	(c)
Phenol	108-95-2	20.00		mg/kg	SO014	0	0.5	100000	120000	NA	-

TABLE 5-2
Comparison of Detected Constituents in Soil with Risk Based Remediation Objectives[a]—Construction Worker Scenario
OMC Plant 2

Chemical	CAS Number	Maximum Detection	Sample Qualifier	Units	Location of Maximum Detection	Sample Beginning Depth (feet bgs)	Sample Ending Depth (feet bgs)	EPA Region 9 Soil Direct Contact PRG (mg/kg)	Tier 1 TACO Construction Worker Soil Value (mg/kg)		Criteria Exceeded
Pyrene	129-00-0	140.00	J	mg/kg	SO035	0	0.5	29126	61000	NA	-
Pesticides/PCBs											
PCB-1248 (Arochlor 1248)	12672-29-6	480.00		mg/kg	SO014	0	0.5	1.43	1.00	NA	TACO & EPA (b)
PCB-1254 (Arochlor 1254)	11097-69-1	190.00		mg/kg	SO014	0	0.5	1.43	1.00	NA	TACO & EPA (b)
PCB-1260 (Arochlor 1260)	11096-82-5	210.00	J	mg/kg	SO014	0	0.5	1.43	1.00	NA	TACO & EPA (b)

J = Estimated value
NA = Not available or not applicable

TACO = Tier 1 Soil Remediation Objectives for Industrial/ Commercial Properties - Appendix B, Table B (IEPA, 2001).

(b) = Region 9 PRG not available, Region 3 RBC used.
(c) = No listing in Region 9 PRGs or Region 3 RBCs.

TABLE 5-3
Comparison of Detected Constituents in Groundwater with Risk Based Remediation Objectives[a]—Residential Scenario
OMC Plant 2

Chemical	CAS Number	Maximum Detection	Sample Qualifier	Units	Location of Maximum Detection	EPA Region 9 PRG, Tap Water (mg/L)	Tier 1 TACO Groundwater Criteria - Class I (mg/L)	Criteria Exceeded
Volatile Organic Compounds (VOCs)								
1,1-Dichloroethane	75-34-3	0.4800		mg/L	OMC-MW503S	0.811	0.700	-
1,2-Dichloroethane	107-06-2	0.0009	J	mg/L	OMC-MW512S	0.00012	0.005	R9 PRGs
1,3-Dichlorobenzene	541-73-1	0.0008		mg/L	OMC-MW517S	0.183	NA	-
Benzene	71-43-2	0.0019		mg/L	OMC-MW515S	0.0004	0.005	R9 PRGs
Carbon disulfide	75-15-0	0.0002	J	mg/L	OMC-MW500S	1.04	0.700	-
Chloroform	67-66-3	0.1400		mg/L	OMC-MW503S	0.00017	0.0002	TACO & EPA
cis-1,2-Dichloroethylene	156-59-2	51.0000	J	mg/L	OMC-MW503S	0.0608	0.07	TACO & EPA
Methylcyclohexane	108-87-2	0.0001	J	mg/L	OMC-MW510S	5.22	NA	-
Toluene	108-88-3	0.0510	J	mg/L	OMC-MW503S	0.723	1.00	-
trans-1,2-Dichloroethene	156-60-5	0.1300		mg/L	OMC-MW503S	0.122	0.100	TACO & EPA
Trichloroethylene	79-01-6	0.9700		mg/L	OMC-MW514S	0.00003	0.005	TACO & EPA
Vinyl chloride	75-01-4	10.0000	J	mg/L	OMC-MW503S	0.00002	0.002	TACO & EPA (b)
Xylenes, Total	1330-20-7	0.0009	J	mg/L	OMC-MW011S	0.206	10 0	-
Semivolatile Organic Compounds (SVOCs)								
Di-n-butyl phthalate	84-74-2	0.0015	J	mg/L	OMC-MW515S	3.65	0.700	-
4-Methylphenol (p-Cresol)	106-44-5	0.0280		mg/L	OMC-MW503S	0.182	NA	-
Pesticides/PCBs								
PCB-1016 (Arochlor 1016)	12674-11-2	0.0140		mg/L	OMC-MW501S	0.00096	0.0005	TACO & EPA (c)
PCB-1248 (Arochlor 1248)	12672-29-6	0.0610	J	mg/L	OMC-MW517S	0.00003	0.0005	TACO & EPA (c)
Metals								
Aluminum (Total)	7429-90-5	0.0274	J	mg/L	OMC-MW505S	36.5	NA	-
Arsenic (Total)	7440-38-2	0.3570	J	mg/L	OMC-MW101	0.00004	0.0500	TACO & EPA
Chromium (Total)	7440-47-3	0.0052	J	mg/L	OMC-MW011S	NA	0.100	(d)
Cobalt (Total)	7440-48-4	0.0039	J	mg/L	OMC-MW516S	0.730	1.00	-
Copper (Total)	7440-50-8	0.0066	J	mg/L	OMC-MW514S	1.46	0.650	-
Iron (Total)	7439-89-6	35.1000		mg/L	OMC-MW503S	10.9	NA	EPA
Magnesium (Total)	7439-95-4	47.3000		mg/L	OMC-MW504S	NA	NA	(d)
Manganese (Total)	7439-96-5	1.0800		mg/L	OMC-MW503S	0.876	0.150	TACO & EPA
Nickel (Total)	7440-02-0	0.0088	J	mg/L	OMC-MW504S	0.730	0.100	(e)
Vanadium (Total)	7440-62-2	0.0023	J	mg/L	OMC-MW503S	0.0365	0.0490	-
Zinc (Total)	7440-66-6	0.0593	J	mg/L	OMC-MW504S	10.9	5.00	-

J = Estimated Value

NA = Not available or not applicable

TACO = Tier 1 Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route - Appendix B, Table E (IEPA, 2001).

(b) = Region 9 PRG for child and adult.

(c) = Region 9 PRG not available, Region 3 RBC used.

(d) = No listing in Region 9 PRGs or Region 3 RBCs.

(e) = Soluble salts.

(a) USEPA Region 9 PRGs and Illinois Tier 1 TACO Values. In their absence, Region 3 RBCs were considered.

TABLE 5-3
Comparison of Detected Constituents in Groundwater with TACO Values—Residential Scenario
OMC Plant 2

Chemical	CAS Number	Maximum Detection	Sample Qualifier	Units	Location of Maximum Detection	EPA Region 9 PRG, Tap Water (mg/L)	Tier 1 TACO Groundwater Criteria - Class I (mg/L)	Criteria Exceeded
Volatile Organic Compounds (VOCs)								
1,1-Dichloroethane	75-34-3	0.4800		mg/L	OMC-MW503S	0.811	0.700	-
1,2-Dichloroethane	107-06-2	0.0009	J	mg/L	OMC-MW512S	0.00012	0.005	R9 PRGs
1,3-Dichlorobenzene	541-73-1	0.0008		mg/L	OMC-MW517S	0.183	NA	-
Benzene	71-43-2	0.0019		mg/L	OMC-MW515S	0.0004	0.005	R9 PRGs
Carbon disulfide	75-15-0	0.0002	J	mg/L	OMC-MW500S	1.04	0.700	-
Chloroform	67-66-3	0.1400		mg/L	OMC-MW503S	0.00017	0.0002	TACO & EPA
cis-1,2-Dichloroethylene	156-59-2	51.0000	J	mg/L	OMC-MW503S	0.0608	0.07	TACO & EPA
Methylcyclohexane	108-87-2	0.0001	J	mg/L	OMC-MW510S	5.22	NA	-
Toluene	108-88-3	0.0510	J	mg/L	OMC-MW503S	0.723	1.00	-
trans-1,2-Dichloroethene	156-60-5	0.1300		mg/L	OMC-MW503S	0.122	0.100	TACO & EPA
Trichloroethylene	79-01-6	0.9700		mg/L	OMC-MW514S	0.00003	0.005	TACO & EPA
Vinyl chloride	75-01-4	10.0000	J	mg/L	OMC-MW503S	0.00002	0.002	TACO & EPA (a)
Xylenes, Total	1330-20-7	0.0009	J	mg/L	OMC-MW011S	0.206	10.0	-
Semivolatile Organic Compounds (SVOCs)								
Di-n-butyl phthalate	84-74-2	0.0015	J	mg/L	OMC-MW515S	3.65	0.700	-
4-Methylphenol (p-Cresol)	106-44-5	0.0280		mg/L	OMC-MW503S	0.182	NA	-
Pesticides/PCBs								
PCB-1016 (Arochlor 1016)	12674-11-2	0.0140		mg/L	OMC-MW501S	0.00096	0.0005	TACO & EPA (b)
PCB-1248 (Arochlor 1248)	12672-29-6	0.0610	J	mg/L	OMC-MW517S	0.00003	0.0005	TACO & EPA (b)
Metals								
Aluminum (Total)	7429-90-5	0.0274	J	mg/L	OMC-MW505S	36.5	NA	-
Arsenic (Total)	7440-38-2	0.3570	J	mg/L	OMC-MW101	0.00004	0.0500	TACO & EPA
Chromium (Total)	7440-47-3	0.0052	J	mg/L	OMC-MW011S	NA	0.100	(c)
Cobalt (Total)	7440-48-4	0.0039	J	mg/L	OMC-MW516S	0.730	1.00	-
Copper (Total)	7440-50-8	0.0066	J	mg/L	OMC-MW514S	1.46	0.650	-
Iron (Total)	7439-89-6	35.1000		mg/L	OMC-MW503S	10.9	NA	EPA
Magnesium (Total)	7439-95-4	47.3000		mg/L	OMC-MW504S	NA	NA	(c)
Manganese (Total)	7439-96-5	1.0800		mg/L	OMC-MW503S	0.876	0.150	TACO & EPA
Nickel (Total)	7440-02-0	0.0088	J	mg/L	OMC-MW504S	0.730	0.100	(d)
Vanadium (Total)	7440-62-2	0.0023	J	mg/L	OMC-MW503S	0.0365	0.0490	-
Zinc (Total)	7440-66-6	0.0593	J	mg/L	OMC-MW504S	10.9	5.00	-

J = Estimated Value
NA = Not available or not applicable
TACO = Tier 1 Groundwater Remediation Objectives for the Groundwater Component of the Groundwater Ingestion Route - Appendix B, Table E (IEPA, 2001).

(a) = Region 9 PRG for child and adult.
(b) = Region 9 PRG not available, Region 3 RBC used.
(c) = No listing in Region 9 PRGs or Region 3 RBCs.
(d) = Soluble salts.

TABLE 5-4

Summary of Estimated Health Risks for Chemicals in Soil

OMC Plant 2

Soil Exposure Scenario	Excess Lifetime Cancer Risk: Ingestion	Dermal Absorption	Ambient Air Inhalation	Total	COPCs Posing Carcinogenic Risk >1x10-4	% Contribution	Noncarcinogenic Hazard Indices: Ingestion	Dermal Absorption	Ambient Air Inhalation	Total	COPCs Posing Hazard Index >1
Residential—Adult (Default RME Scenario)	NA	NA	NA	NA			0.1	0.1	0.0003	0.2	
Residential—Child (Default RME Scenario)	NA	NA	NA	NA			0.04	0.1	0.0006	0.1	
Residential—Lifetime (Child/Adult)	**2E-04**	**1E-04**	4E-07	**4E-04**	Benzo(a)pyrene	43%	NA	NA	NA	NA	
(Default RME Scenario)					Dibenz(a,h)anthracen	31%					
Recreational User—Adult (Default RME Scenario)	5E-05	**1E-04**	8E-10	**2E-04**	PCBs (1248, 1254, 1260)	67%	0.8	**2**	0.000489	**3**	PCB-1254 (Arochlor 1254)
					Benzo(a)Pyrene	18%					
Recreationa User—Adolescent (Default RME Scenario)	3E-05	8E-05	7E-09	**1E-04**	PCBs (1248, 1254, 1260)	67%	**1**	**3**	0.00010	**5**	PCB-1254 (Arochlor 1254)
					Benzo(a)Pyrene	18%					
Construction Worker (Default RME Scenario)	1E-05	3E-06	7E-10	1E-05			0.4	0.1	0.00002	0.5	

Note: **Bolded** values indicate exceedance of 10^{-4} risk level or exceedance of threshold level of 1.0.

TABLE 5-5

Summary of Estimated Health Risks for Chemicals in Groundwater

OMC Plant 2

Groundwater Exposure Scenario	Excess Lifetime Cancer Risk					COPCs Posing Carcinogenic Risk >1x10^{-4}	% Contribution	Noncarcinogenic Hazard Indices					COPCs Posing Hazard Index >1
	Ingestion	Dermal Absorption	Ambient Air Inhalation	Indoor/ Outdoor Air Inhalation	Total			Ingestion	Dermal Absorption	Ambient Air Inhalation	Indoor/ Outdoor Air Inhalation	Total	
Residential—Adult (Default RME Scenario)	NA	NA	NA	NA	NA			**132**	**10**	0.2	NA	**141**	Arsenic, trichloroethylene, Aroclor-1248
Residential—Child (Default RME Scenario)	NA	NA	NA	NA	NA			**307**	**17**	**1**	NA	**325**	Arsenic, trichloroethylene, Aroclor-1248
Residential—Lifetime (Child/Adult), Outdoor (Default RME Scenario)	**1E-02**	**2E-03**	**1E-04**	NA	**2E-02**	Arsenic	56%	NA	NA	NA	NA	NA	
						Vinyl chloride	22%						
						Trichloroethylene	13%						
Residential—Adult, Indoor Vapor Intrusion (Default REM Scenario)	NA	NA	NA	**6E-04**	**6E-04**	Vinyl Chloride	91%	NA	NA	NA	**3**	**3**	Trichloroethene, Vinyl Chloride
Residential—Adult, Outdoor Air (Default RME Scenario)	NA	NA	NA	NA	NA			NA	NA	NA	0.00004	0.00004	
Residential—Child, Outdoor Air	NA	NA	NA	NA	NA	cis-1,2-Dichloroethylene	67%	NA	NA	NA	0.0001	0.0001	
(Default RME Scenario)						Trichloroethylene	32%						
Residential—Lifetime (Child/Adult), Outdoor Air (Default RME Scenario)	NA	NA	NA	5E-10	5E-10	Trichloroethylene	91%	NA	NA	NA	NA	NA	
Construction Worker, (Default RME Scenario)	NA	**6E-04**	2E-08	NA	**6E-04**	Vinyl Chloride	94%	NA	**7**	0.01	NA	**7**	cis-1,2-Dichloroethylene, Vinyl Chloride

Note: **Bolded** values indicate exceedance of 10^{-4} risk level or exceedance of threshold level of 1.0.

TABLE 5-6
Summary of Estimated Health Risks for Chemicals in Porous and Non-Porous Surfaces
OMC Plant 2

Trespasser Exposure Scenario	Excess Lifetime Cancer Risk: Dermal Absorption	Total	COPCs Posing Carcinogenic Risk >1x10-4	% Contribution	Noncarcinogenic Hazard Indices: Dermal Absorption	Total	COPCs Posing Hazard Index >1
Trespasser—Adult (Default RME Scenario)	2E-05	2E-05			NA	NA	

Note: **Bolded** values indicate exceedance of 10^{-4} risk level or exceedance of threshold level of 1.0.

TABLE 6-1
Assessment and Measurement Endpoints
OMC Plant 2

Assessment Endpoint	Measurement Endpoint	Receptor
Survival, growth, and reproduction of terrestrial soil invertebrate communities	Comparison of screening values for soil invertebrates with chemical concentrations in surface soil	Soil invertebrates (earthworms)
Survival, growth, and reproduction of terrestrial plant communities	Comparison of screening values for terrestrial plants with chemical concentrations in surface soil	Terrestrial plants
Survival, growth, and reproduction of threatened and endangered plant species	Comparison of screening values for terrestrial plants with chemical concentrations in surface soil	Threatened and endangered plant species
Survival, growth, and reproduction of avian terrestrial insectivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	American robin
Survival, growth, and reproduction of avian terrestrial carnivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Red-tailed hawk
Survival, growth, and reproduction of avian terrestrial herbivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Mourning dove
Survival, growth, and reproduction of mammalian terrestrial insectivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Short-tailed shrew
Survival, growth, and reproduction of mammalian terrestrial herbivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Meadow vole
Survival, growth, and reproduction of mammalian terrestrial carnivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Red fox
Survival, growth, and reproduction of terrestrial reptiles	Evidence of potential risk to other upper trophic level terrestrial receptors evaluated in the ERA	--

TABLE 6-2
Surface Soil Screening Statistics—Step 2—Current Use
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Metals (mg/kg)							
Aluminum	1.30E+03, pH 7.7-9	pH<5.5	OK	No	pH<5.5	OK	No
Arsenic	5.40E+00	1.80E+01	3.00E-01	No	6.00E+01	9.00E-02	No
Barium	7.10E+00	5.00E+02	1.42E-02	No	3.30E+02	2.15E-02	No
Beryllium	4.00E-01	1.00E+01	4.00E-02	No	4.00E+01	1.00E-02	No
Cadmium	1.70E-01	3.20E+01	5.31E-03	No	2.00E+01	8.50E-03	No
Chromium, Total	1.00E+01	1.00E+00	**1.00E+01**	**Yes**	4.00E-01	**2.50E+01**	**Yes**
Cobalt	1.80E+00	1.30E+01	1.38E-01	No	2.00E+01	9.00E-02	No
Copper	4.50E+00	1.00E+02	4.50E-02	No	5.00E+01	9.00E-02	No
Iron	4.80E+03, pH 7.7-9	5<pH<8	**pH>8**	**Yes**	5<pH<8	**pH>8**	**Yes**
Lead	1.10E+01	1.20E+02	9.17E-02	No	1.70E+03	6.47E-03	No
Manganese	2.70E+02	5.00E+02	5.40E-01	No	1.00E+02	**2.70E+00**	**Yes**
Mercury	8.70E-03	3.00E-01	2.90E-02	No	1.00E-01	8.70E-02	No
Nickel	4.10E+00	3.00E+01	1.37E-01	No	2.00E+02	2.05E-02	No
Vanadium	1.30E+01	2.00E+00	**6.50E+00**	**Yes**	2.00E+00	**6.50E+00**	**No**
Zinc	2.80E+01	5.00E+01	5.60E-01	No	2.00E+02	1.40E-01	No
Polychlorinated Biphenyls							
PCB-1248	7.30E+05	4.00E+04	**1.83E+01**	**Yes**	2.51E+03	**2.91E+02**	**Yes**
PCB-1254	1.90E+05	4.00E+04	**4.75E+00**	**Yes**	2.51E+03	**7.57E+01**	**Yes**
PCB-1260	2.10E+05	4.00E+04	**5.25E+00**	**Yes**	2.51E+03	**8.37E+01**	**Yes**
Semivolatile Organics							
1,2-Benzphenanthrene	6.30E+04	1.20E+03	**5.25E+01**	**Yes**	2.50E+04	**2.52E+00**	**Yes**
2-Methylnaphthalene	3.00E+03	3.00E+01	**1.00E+02**	**Yes**	5.40E+02	**5.56E+00**	**Yes**
Acenaphthene	1.90E+04	2.00E+04	9.50E-01	No	1.40E+04	**1.36E+00**	**Yes**
Acenaphthylene	2.10E+03	2.00E+04	1.05E-01	No	1.40E+04	1.50E-01	No
Acetophenone	1.70E+02	3.00E+04	5.67E-03	No	3.00E+04	5.67E-03	No
Anthracene	1.70E+04	1.20E+03	**1.42E+01**	**Yes**	2.50E+04	6.80E-01	No
Benzo(a)anthracene	4.70E+04	1.20E+03	**3.92E+01**	**Yes**	2.50E+04	**1.88E+00**	**Yes**
Benzo(a)pyrene	4.00E+04	1.20E+03	**3.33E+01**	**Yes**	2.50E+04	**1.60E+00**	**Yes**
Benzo(b)fluoranthene	5.10E+04	1.20E+03	**4.25E+01**	**Yes**	2.50E+04	**2.04E+00**	**Yes**
Benzo(g,h,i)perylene	3.20E+04	1.20E+03	**2.67E+01**	**Yes**	2.50E+04	**1.28E+00**	**Yes**
Benzo(k)fluoranthene	2.90E+04	1.20E+03	**2.42E+01**	**Yes**	2.50E+04	**1.16E+00**	**Yes**
Bis(2-ethylhexyl)phthalate	3.10E+03	1.00E+02	**3.10E+01**	**Yes**	1.00E+02	**3.10E+01**	**Yes**
Carbazole	1.70E+04	No Screening Value		**Yes**	1.70E+04	**1.00E+00**	**Yes**
Dibenz(a,h)anthracene	1.30E+04	1.20E+03	**1.08E+01**	**Yes**	2.50E+04	5.20E-01	No
Dibenzofuran	1.60E+04	No Screening Value		**Yes**	1.40E+04	**1.14E+00**	**Yes**
Di-n-butylphthalate	3.90E+02	2.00E+05	1.95E-03	No	3.05E+04	1.28E-02	No
Fluoranthene	1.50E+05	1.20E+03	**1.25E+02**	**Yes**	2.10E+04	**7.14E+00**	**Yes**
Fluorene	1.70E+04	1.20E+03	**1.42E+01**	**Yes**	1.40E+04	**1.21E+00**	**Yes**
Indeno(1,2,3-cd)pyrene	2.70E+04	1.20E+03	**2.25E+01**	**Yes**	2.50E+04	**1.08E+00**	**Yes**
Naphthalene	5.10E+03	3.00E+01	**1.70E+02**	**Yes**	5.40E+02	**9.44E+00**	**Yes**
Phenanthrene	2.00E+05	1.20E+03	**1.67E+02**	**Yes**	2.10E+04	**9.52E+00**	**Yes**
Pyrene	1.40E+05	1.20E+03	**1.17E+02**	**Yes**	1.30E+04	**1.08E+01**	**Yes**
Volatile Organics							
Acetone	5.40E+01	2.50E+03	2.16E-02	No	2.50E+03	2.16E-02	No
Benzene	1.50E+01	2.40E+02	6.25E-02	No	1.61E+03	9.32E-03	No
Carbon Disulfide	6.00E+00	9.41E+01	6.38E-02	No	9.41E+01	6.38E-02	No
Dichloromethane	6.00E+00	2.00E+03	3.00E-03	No	2.00E+03	3.00E-03	No
Trichloroethylene	1.60E+02	1.40E+02	**1.14E+00**	**Yes**	7.90E+02	2.03E-01	No

TABLE 6-3
Surface Soil Screening Statistics—Step 2—Future Redevelopment
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Metals (mg/kg)							
Aluminum	1.30E+03, pH 7.7-9	pH<5.5	OK	No	pH<5.5	OK	No
Arsenic	5.40E+00	1.80E+01	3.00E-01	No	6.00E+01	9.00E-02	No
Barium	7.10E+00	5.00E+02	1.42E-02	No	3.30E+02	2.15E-02	No
Beryllium	4.00E-01	1.00E+01	4.00E-02	No	4.00E+01	1.00E-02	No
Cadmium	1.70E-01	3.20E+01	5.31E-03	No	2.00E+01	8.50E-03	No
Chromium. Total	1.00E+01	1.00E+00	**1.00E+01**	**Yes**	4.00E-01	**2.50E+01**	**Yes**
Cobalt	1.80E+00	1.30E+01	1.38E-01	No	2.00E+01	9.00E-02	No
Copper	4.50E+00	1.00E+02	4.50E-02	No	5.00E+01	9.00E-02	No
Iron	4.80E+03, pH 7.7-9	5<pH<8	**pH>8**	**Yes**	5<pH<8	**pH>8**	**Yes**
Lead	1.10E+01	1.20E+02	9.17E-02	No	1.70E+03	6.47E-03	No
Manganese	2.70E+02	5.00E+02	5.40E-01	No	1.00E+02	**2.70E+00**	**Yes**
Mercury	8.70E-03	3.00E-01	2.90E-02	No	1.00E-01	8.70E-02	No
Nickel	4.10E+00	3.00E+01	1.37E-01	No	2.00E+02	2.05E-02	No
Vanadium	1.30E+01	2.00E+00	**6.50E+00**	**Yes**	2.00E+00	**6.50E+00**	**Yes**
Zinc	2.80E+01	5.00E+01	5.60E-01	No	2.00E+02	1.40E-01	No
Polychlorinated Biphenyls							
PCB-1248	7.30E+05	4.00E+04	**1.83E+01**	**Yes**	2.51E+03	**2.91E+02**	**Yes**
PCB-1254	1.90E+05	4.00E+04	**4.75E+00**	**Yes**	2.51E+03	**7.57E+01**	**Yes**
PCB-1260	2.10E+05	4.00E+04	**5.25E+00**	**Yes**	2.51E+03	**8.37E+01**	**Yes**
Semivolatile Organics							
1,2-Benzphenanthrene	2.40E+04	1.20E+03	**2.00E+01**	**Yes**	2.50E+04	9.60E-01	No
2-Methylnaphthalene	9.00E+02	3.00E+01	**3.00E+01**	**Yes**	5.40E+02	**1.67E+00**	**Yes**
Acenaphthene	4.20E+03	2.00E+04	2.10E-01	No	1.40E+04	3.00E-01	No
Acenaphthylene	2.10E+03	2.00E+04	1.05E-01	No	1.40E+04	1.50E-01	No
Acetophenone	1.70E+02	3.00E+04	5.67E-03	No	3.00E+04	5.67E-03	No
Anthracene	6.20E+03	1.20E+03	**5.17E+00**	**Yes**	2.50E+04	2.48E-01	No
Benzaldehyde	4.50E+01	No Screening Value		**Yes**	No Screening Value		**Yes**
Benzo(a)anthracene	1.70E+04	1.20E+03	**1.42E+01**	**Yes**	2.50E+04	6.80E-01	No
Benzo(a)pyrene	2.00E+04	1.20E+03	**1.67E+01**	**Yes**	2.50E+04	8.00E-01	No
Benzo(b)fluoranthene	2.40E+04	1.20E+03	**2.00E+01**	**Yes**	2.50E+04	9.60E-01	No
Benzo(g,h,i)perylene	1.20E+04	1.20E+03	**1.00E+01**	**Yes**	2.50E+04	4.80E-01	No
Benzo(k)fluoranthene	2.10E+04	1.20E+03	**1.75E+01**	**Yes**	2.50E+04	8.40E-01	No
Bis(2-ethylhexyl)phthalate	7.70E+02	1.00E+02	**7.70E+00**	**Yes**	1.00E+02	**7.70E+00**	**Yes**
Carbazole	5.70E+03	No Screening Value		**Yes**	1.70E+04	3.35E-01	No
Dibenz(a,h)anthracene	6.50E+03	1.20E+03	**5.42E+00**	**Yes**	2.50E+04	2.60E-01	No
Dibenzofuran	3.20E+03	No Screening Value		**Yes**	1.40E+04	2.29E-01	No
Di-n-butylphthalate	1.80E+02	2.00E+05	9.00E-04	No	3.05E+04	5.90E-03	No
Fluoranthene	4.50E+04	1.20E+03	**3.75E+01**	**Yes**	2.10E+04	**2.14E+00**	**Yes**
Fluorene	3.40E+03	1.20E+03	**2.83E+00**	**Yes**	1.40E+04	2.43E-01	No
Indeno(1,2,3-cd)pyrene	1.50E+04	1.20E+03	**1.25E+01**	**Yes**	2.50E+04	6.00E-01	No
Naphthalene	1.30E+03	3.00E+01	**4.33E+01**	**Yes**	5.40E+02	**2.41E+00**	**Yes**

TABLE 6-3
Surface Soil Screening Statistics—Step 2—Future Redevelopment
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Phenanthrene	4.70E+04	1.20E+03	**3.92E+01**	**Yes**	2.10E+04	**2.24E+00**	**Yes**
Phenol	2.00E+04	7.00E+04	2.86E-01	No	1.00E+05	2.00E-01	No
Pyrene	4.50E+04	1.20E+03	**3.75E+01**	**Yes**	1.30E+04	**3.46E+00**	**Yes**
Volatile Organics							
Acetone	5.40E+01	2.50E+03	2.16E-02	No	2.50E+03	2.16E-02	No
Benzene	1.50E+01	2.40E+02	6.25E-02	No	1.61E+03	9.32E-03	No
Carbon Disulfide	6.00E+00	9.41E+01	6.38E-02	No	9.41E+01	6.38E-02	No
Cyclohexane	7.00E+00	3.05E+03	2.30E-03	No	3.05E+03	2.30E-03	No
cis-1,2-Dichloroethylene	1.30E+01	7.84E+02	1.66E-02	No	7.84E+02	1.66E-02	No
Dichloromethane	5.00E+00	2.00E+03	2.50E-03	No	2.00E+03	2.50E-03	No
Methylbenzene	6.80E+01	7.00E+01	9.71E-01	No	4.40E+02	1.55E-01	No
Trichloroethylene	1.60E+02	1.40E+02	**1.14E+00**	**Yes**	7.90E+02	2.03E-01	No

TABLE 6-4
Bird and Mammal Hazard Quotients—Step 2—Current Use
OMC Plant 2

Chemical	Short-tailed shrew	Meadow vole	Red fox	American robin	Mourning dove	Red-tailed hawk
Inorganics						
Arsenic	**3.56E+00**	**4.87E+00**	<1.00E-02	9.64E-02	4.10E-01	<1.00E-02
Cadmium	8.59E-01	5.61E-02	4.07E-02	3.67E-01	6.26E-02	1.81E-02
Chromium	**1.25E+00**	3.33E-02	5.10E-02	**2.47E+00**	2.21E-01	1.33E-01
Copper	1.20E-02	<1.00E-02	2.26E-02	1.16E-02	1.05E-02	<1.00E-02
Lead	2.84E-01	6.82E-02	1.92E-02	3.45E-01	8.19E-01	3.10E-02
Mercury	6.99E-01	1.38E-01	<1.00E-02	2.82E-02	1.58E-02	<1.00E-02
Nickel	6.19E-02	1.48E-02	<1.00E-02	1.95E-02	1.25E-02	<1.00E-02
Zinc	2.82E-01	3.25E-02	1.70E-01	**1.92E+00**	5.85E-01	2.08E-01
Polychlorinated Biphenyls						
PCB-1248	**2.13E+04**	**2.66E+01**	**7.81E+02**	**2.19E+03**	**3.45E+01**	**2.28E+02**
PCB-1254	**5.55E+03**	**6.93E+00**	**2.03E+02**	**5.69E+02**	**8.98E+00**	**5.95E+01**
PCB-1260	**6.13E+03**	**7.65E+00**	**2.25E+02**	**6.29E+02**	**9.93E+00**	**6.57E+01**
Semivolatile Organics						
Acenaphthene	<1.00E-02	<1.00E-02	<1.00E-02	7.17E-02	2.28E-02	1.00E-02
Acenaphthylene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	1.56E-02	<1.00E-02
Anthracene	<1.00E-02	<1.00E-02	<1.00E-02	6.78E-02	9.72E-02	1.24E-02
Benzo(a)anthracene	**2.44E+00**	1.83E-01	2.60E-01	1.62E-01	7.13E-02	2.38E-02
Benzo(a)pyrene	**2.42E+00**	5.67E-01	2.78E-01	1.68E-01	1.54E-01	2.72E-02
Benzo(b)fluoranthene	**2.27E+00**	**1.72E+00**	3.68E-01	1.43E-01	4.21E-01	3.62E-02
Benzo(g,h,i)perylene	**1.19E+00**	**2.47E+00**	3.17E-01	6.87E-02	5.79E-01	3.32E-02
Benzo(k)fluoranthene	**1.29E+00**	2.82E-01	1.57E-01	8.11E-02	8.23E-02	1.43E-02
Dibenz(a,h)anthracene	**1.03E+00**	2.02E-01	1.10E-01	7.58E-02	5.41E-02	1.12E-02
Fluoranthene	1.93E-02	1.58E-02	<1.00E-02	6.79E-01	**1.89E+00**	1.60E-01
Fluorene	<1.00E-02	<1.00E-02	<1.00E-02	4.57E-02	2.04E-02	<1.00E-02
Indeno(1,2,3-cd)pyrene	**1.87E+00**	3.66E-01	2.04E-01	1.34E-01	1.00E-01	2.03E-02
Phenanthrene	2.12E-02	<1.00E-02	<1.00E-02	7.11E-01	7.55E-01	1.22E-01
Pyrene	**9.34E+00**	**1.05E+01**	**1.67E+00**	6.64E-01	**2.46E+00**	1.80E-01

TABLE 6-5
Bird and Mammal Hazard Quotients—Step 2—Future Development
OMC Plant 2

Chemical	Short-tailed shrew	Meadow vole	Red fox	American robin	Mourning dove	Red-tailed hawk
Inorganics						
Arsenic	**3.56E+00**	**4.87E+00**	<1.00E-02	9.64E-02	4.10E-01	<1.00E-02
Cadmium	8.59E-01	5.61E-02	4.07E-02	3.67E-01	6.26E-02	1.81E-02
Chromium	**1.25E+00**	3.33E-02	5.10E-02	**2.47E+00**	2.21E-01	1.33E-01
Copper	1.20E-02	<1.00E-02	2.26E-02	1.16E-02	1.05E-02	<1.00E-02
Lead	2.84E-01	6.82E-02	1.92E-02	3.45E-01	8.19E-01	3.10E-02
Mercury	7.63E-01	1.50E-01	<1.00E-02	3.08E-02	1.72E-02	<1.00E-02
Nickel	6.19E-02	1.48E-02	<1.00E-02	1.95E-02	1.25E-02	<1.00E-02
Zinc	2.82E-01	3.25E-02	1.70E-01	**1.92E+00**	5.85E-01	2.08E-01
Polychlorinated Biphenyls						
PCB-1248	**2.13E+04**	**2.66E+01**	**7.81E+02**	**2.19E+03**	**3.45E+01**	**2.28E+02**
PCB-1254	**5.55E+03**	**6.93E+00**	**2.03E+02**	**5.69E+02**	**8.98E+00**	**5.95E+01**
PCB-1260	**6.13E+03**	**7.65E+00**	**2.25E+02**	**6.29E+02**	**9.93E+00**	**6.57E+01**
Semivolatile Organics						
Acenaphthene	<1.00E-02	<1.00E-02	<1.00E-02	1.58E-02	<1.00E-02	<1.00E-02
Acenaphthylene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	1.56E-02	<1.00E-02
Anthracene	<1.00E-02	<1.00E-02	<1.00E-02	2.47E-02	4.25E-02	<1.00E-02
Benzo(a)anthracene	8.82E-01	7.83E-02	9.51E-02	5.86E-02	2.86E-02	<1.00E-02
Benzo(a)pyrene	**1.21E+00**	2.87E-01	1.39E-01	8.41E-02	7.77E-02	1.36E-02
Benzo(b)fluoranthene	**1.07E+00**	8.09E-01	1.73E-01	6.71E-02	1.98E-01	1.70E-02
Benzo(g,h,i)perylene	4.44E-01	7.80E-01	1.08E-01	2.58E-02	1.84E-01	1.11E-02
Benzo(k)fluoranthene	9.34E-01	2.11E-01	1.14E-01	5.87E-02	6.12E-02	1.04E-02
Dibenz(a,h)anthracene	5.14E-01	1.01E-01	5.49E-02	3.79E-02	2.70E-02	<1.00E-02
Fluoranthene	<1.00E-02	<1.00E-02	<1.00E-02	2.04E-01	5.66E-01	4.79E-02
Fluorene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02
Indeno(1,2,3-cd)pyrene	**1.04E+00**	2.03E-01	1.13E-01	7.44E-02	5.55E-02	1.13E-02
Phenanthrene	<1.00E-02	<1.00E-02	<1.00E-02	1.67E-01	2.66E-01	3.22E-02
Pyrene	**3.00E+00**	3.37E+00	5.38E-01	2.14E-01	7.92E-01	5.80E-02

TABLE 6-6
Surface Soil Screening Statistics—COPEC Refinement—Current Use
OMC Plant 2

Chemical	Average Concentration	Soil Flora		Soil Fauna	
		Screening Value	HQ	Screening Value	HQ
Inorganics					
Chromium, Total	5.13E+00	1.00E+00	**5.13E+00**	4.00E-01	**1.28E+01**
Iron	3.35E+03, pH of 8.5	5<pH<8	**pH>8**	5<pH<8	**pH>8**
Manganese	1.08E+02	--	--	1.00E+02	**1.08E+00**
Vanadium	7.94E+00	2.00E+00	**3.97E+00**	2.00E+00	**3.97E+00**
Polychlorinated Biphenyls					
PCB-1248	1.72E+04	4.00E+04	4.31E-01	2.51E+03	**6.87E+00**
PCB-1254	4.89E+03	4.00E+04	1.22E-01	2.51E+03	**1.95E+00**
PCB-1260	4.44E+03	4.00E+04	1.11E-01	2.51E+03	**1.77E+00**
Semivolatile Organics					
1,2-Benzphenanthrene	3.94E+03	1.20E+03	**3.28E+00**	2.50E+04	1.58E-01
2-Methylnaphthalene	3.56E+02	3.00E+01	**1.19E+01**	5.40E+02	6.59E-01
Acenaphthene	1.48E+03	--	--	1.40E+04	1.06E-01
Anthracene	1.61E+03	1.20E+03	**1.34E+00**	--	--
Benzo(a)anthracene	2.81E+03	1.20E+03	**2.34E+00**	2.50E+04	1.12E-01
Benzo(a)pyrene	2.98E+03	1.20E+03	**2.48E+00**	2.50E+04	1.19E-01
Benzo(b)fluoranthene	3.51E+03	1.20E+03	**2.92E+00**	2.50E+04	1.40E-01
Benzo(g,h,i)perylene	2.30E+03	1.20E+03	**1.92E+00**	2.50E+04	9.21E-02
Benzo(k)fluoranthene	2.49E+03	1.20E+03	**2.08E+00**	2.50E+04	9.97E-02
Bis(2-ethylhexyl)phthalate	1.34E+03	1.00E+02	**1.34E+01**	1.00E+02	**1.34E+01**
Carbazole	1.58E+03	No Screening Value		1.70E+04	9.27E-02
Dibenz(a,h)anthracene	1.77E+03	1.20E+03	**1.48E+00**	--	--
Dibenzofuran	1.44E+03	No Screening Value		1.40E+04	1.03E-01
Fluoranthene	6.87E+03	1.20E+03	**5.73E+00**	2.10E+04	3.27E-01
Fluorene	1.52E+03	1.20E+03	**1.27E+00**	1.40E+04	1.09E-01
Indeno(1,2,3-cd)pyrene	2.51E+03	1.20E+03	**2.09E+00**	2.50E+04	1.00E-01
Naphthalene	1.30E+03	3.00E+01	**4.33E+01**	5.40E+02	**2.40E+00**
Phenanthrene	6.52E+03	1.20E+03	**5.43E+00**	2.10E+04	3.10E-01
Pyrene	6.45E+03	1.20E+03	**5.38E+00**	1.30E+04	4.96E-01
Volatile Organics					
Trichloroethylene	1.18E+01	1.40E+02	8.46E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE 6-7
Surface Soil Screening Statistics—COPEC Refinement—Future Redevelopment
OMC Plant 2

Chemical	Average Concentration	Soil Flora Screening Value	Soil Flora HQ	Soil Fauna Screening Value	Soil Fauna HQ
Inorganics					
Chromium, Total	5.13E+00	1.00E+00	**5.13E+00**	4.00E-01	**1.28E+01**
Iron	3.35E+03, pH of 8.5	5<pH<8	**pH>8**	5<pH<8	**pH>8**
Manganese	1.08E+02	--	--	1.00E+02	**1.08E+00**
Vanadium	7.94E+00	2.00E+00	**3.97E+00**	2.00E+00	**3.97E+00**
Polychlorinated Biphenyls					
PCB-1248	2.13E+04	4.00E+04	5.32E-01	2.51E+03	**8.48E+00**
PCB-1254	6.16E+03	4.00E+04	1.54E-01	2.51E+03	**2.45E+00**
PCB-1260	5.53E+03	4.00E+04	1.38E-01	2.51E+03	**2.20E+00**
Semivolatile Organics					
1,2-Benzphenanthrene	2.26E+03	1.20E+03	**1.88E+00**	--	--
2-Methylnaphthalene	1.49E+02	3.00E+01	**4.98E+00**	5.40E+02	2.77E-01
Anthracene	1.34E+03	1.20E+03	**1.11E+00**	--	--
Benzaldehyde	1.70E+02	No Screening Value		No Screening Value	
Benzo(a)anthracene	1.95E+03	1.20E+03	**1.62E+00**	--	--
Benzo(a)pyrene	2.27E+03	1.20E+03	**1.89E+00**	--	--
Benzo(b)fluoranthene	2.49E+03	1.20E+03	**2.07E+00**	--	--
Benzo(g,h,i)perylene	1.72E+03	1.20E+03	**1.44E+00**	--	--
Benzo(k)fluoranthene	1.91E+03	1.20E+03	**1.59E+00**	--	--
Bis(2-ethylhexyl)phthalate	1.71E+02	1.00E+02	**1.71E+00**	1.00E+02	**1.71E+00**
Carbazole	1.33E+03	No Screening Value		--	--
Dibenz(a,h)anthracene	1.52E+03	1.20E+03	**1.26E+00**	--	--
Dibenzofuran	3.94E+02	No Screening Value		--	--
Fluoranthene	4.05E+03	1.20E+03	**3.38E+00**	2.10E+04	1.93E-01
Fluorene	4.31E+02	1.20E+03	3.59E-01	--	--
Indeno(1,2,3-cd)pyrene	1.88E+03	1.20E+03	**1.57E+00**	--	--
Naphthalene	1.64E+02	3.00E+01	**5.48E+00**	5.40E+02	3.04E-01
Phenanthrene	3.35E+03	1.20E+03	**2.79E+00**	2.10E+04	1.60E-01
Pyrene	4.02E+03	1.20E+03	**3.35E+00**	1.30E+04	3.09E-01
Volatile Organics					
Trichloroethylene	1.14E+01	1.40E+02	8.13E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE 6-8
Bird and Mammal Hazard Quotients—COPEC Refinement—Current Use
OMC Plant 2

Chemical	Short-tailed shrew		Meadow vole		Red fox		American robin		Mourning dove		Red-tailed hawk	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics												
Arsenic	2.62E-01	5.24E-02	2.71E-02	<1.00E-02	--	--	--	--	--	--	--	--
Chromium	5.48E-02	1.10E-02	--	--	--	--	7.69E-02	1.54E-02	--	--	--	--
Zinc	--	--	--	--	--	--	1.18E-01	1.30E-02	--	--	--	--
Polychlorinated Biphenyls												
PCB-1248	**1.02E+02**	**1.02E+01**	**1.68E+00**	1.68E-01	**2.76E+00**	5.60E-01	**7.10E+00**	7.10E-01	7.08E-01	7.08E-02	8.56E-01	8.56E-02
PCB-1254	**2.94E+01**	**2.94E+00**	4.86E-01	4.86E-02	7.99E-01	1.62E-01	**2.06E+00**	2.06E-01	2.05E-01	2.05E-02	2.48E-01	2.48E-02
PCB-1260	**2.64E+01**	**2.64E+00**	4.36E-01	4.36E-02	7.17E-01	1.45E-01	**1.85E+00**	1.85E-01	1.84E-01	1.84E-02	2.22E-01	2.22E-02
Semivolatile Organics												
Benzo(a)anthracene	6.10E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	8.33E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	6.99E-02	<1.00E-02	3.94E-02	<1.00E-02	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	4.18E-02	<1.00E-02	3.73E-02	<1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	5.20E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	7.24E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	--	--	--	--	--	--	--	3.59E-02	<1.00E-02	--	--
Indeno(1,2,3-cd)pyrene	7.88E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Pyrene	1.72E-01	1.72E-02	1.41E-01	1.41E-02	2.39E-02	<1.00E-02	--	--	4.97E-02	<1.00E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE 6-9
Bird and Mammal Hazard Quotients—COPEC Refinement—Future Redevelopment
OMC Plant 2

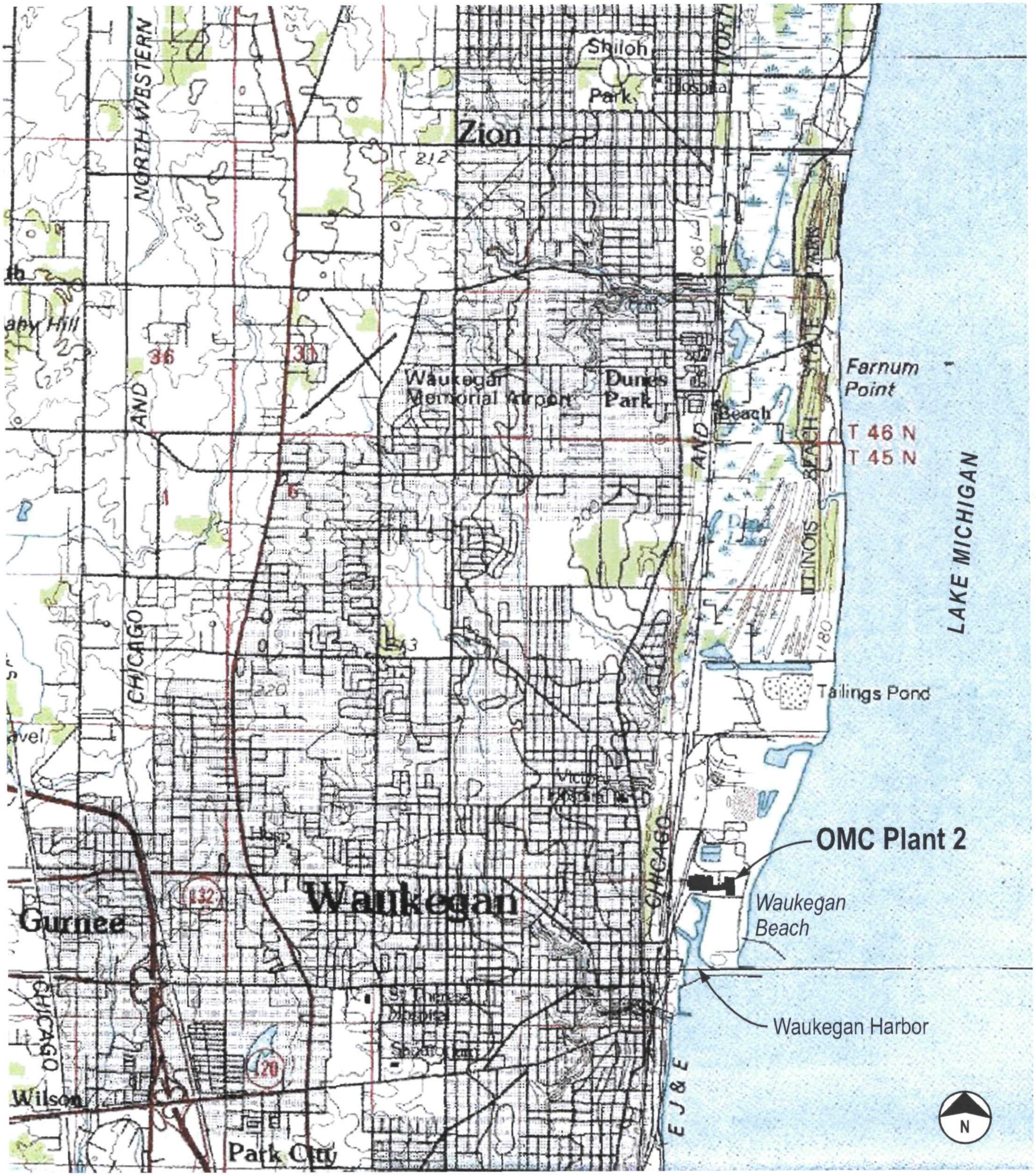
Chemical	Short-tailed shrew		Meadow vole		Red fox		American robin		Mourning dove		Red-tailed hawk	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics												
Arsenic	2.62E-01	5.24E-02	2.71E-02	<1.00E-02	--	--	--	--	--	--	--	--
Chromium	5.48E-02	1.10E-02	--	--	--	--	7.69E-02	1.54E-02	--	--	--	--
Zinc	--	--	--	--	--	--	1.18E-01	1.30E-02	--	--	--	--
Polychlorinated Biphenyls												
PCB-1248	**8.22E+01**	**8.22E+00**	**1.36E+00**	1.36E-01	**2.23E+00**	4.53E-01	**5.75E+00**	5.75E-01	5.74E-01	5.74E-02	6.93E-01	6.93E-02
PCB-1254	**2.33E+01**	**2.33E+00**	3.86E-01	3.86E-02	6.34E-01	1.29E-01	**1.63E+00**	1.63E-01	1.63E-01	1.63E-02	1.97E-01	1.97E-02
PCB-1260	**2.12E+01**	**2.12E+00**	3.50E-01	3.50E-02	5.75E-01	1.17E-01	**1.48E+00**	1.48E-01	1.48E-01	1.48E-02	1.78E-01	1.78E-02
Semivolatile Organics												
Benzo(a)pyrene	1.10E-01	1.10E-02	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	9.86E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	1.05E-01	1.05E-02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.77E-01	2.77E-02	--	--	--	--	--	--	--	--	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE 6-10
Surface Soil Inorganics Comparison to Background—COPEC Refinement
OMC Plant 2

Chemical	Background Concentration (mg/kg)	Maximum Concentration (mg/kg)	Average Concentration (mg/kg)	Maximum/ Background Ratio	Average/ Background Ratio
Current Scenario					
Chromium, Total	1.62E+01	1.00E+01	5.13E+00	6.17E-01	3.17E-01
Iron	1.59E+04	4.80E+03	3.35E+03	3.02E-01	2.11E-01
Manganese	6.36E+02	2.70E+02	1.08E+02	4.25E-01	1.69E-01
Vanadium	2.52E+01	1.30E+01	7.94E+00	5.16E-01	3.15E-01
Future Development					
Chromium, Total	1.62E+01	1.00E+01	5.13E+00	6.17E-01	3.17E-01
Iron	1.59E+04	4.80E+03	3.35E+03	3.02E-01	2.11E-01
Manganese	6.36E+02	2.70E+02	1.08E+02	4.25E-01	1.69E-01
Vanadium	2.52E+01	1.30E+01	7.94E+00	5.16E-01	3.15E-01

Figures



SOURCE: USGS Waukegan Quadrangle Map

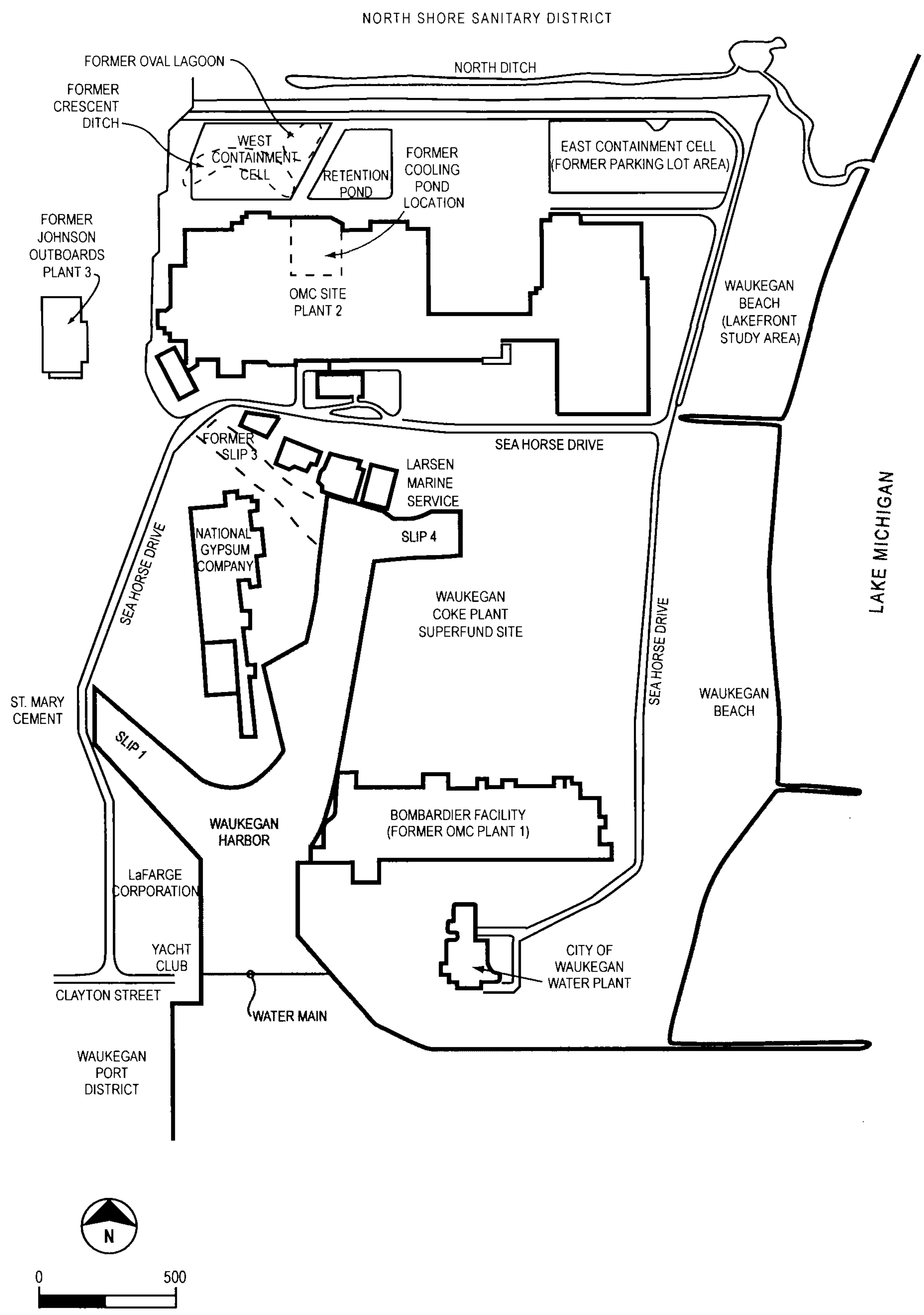
0 3,000

SCALE IN FEET

Figure 1-1
Site Location Map
OMC Plant 2

E082005021MKE 186305.RS.01 Site Loc Map_Mar06_4 3-29-06tll/jls

CH2MHILL



SOURCE: ADAPTED FROM USEPA 2002

Figure 1-2
Vicinity Features
OMC Plant 2

CH2MHILL

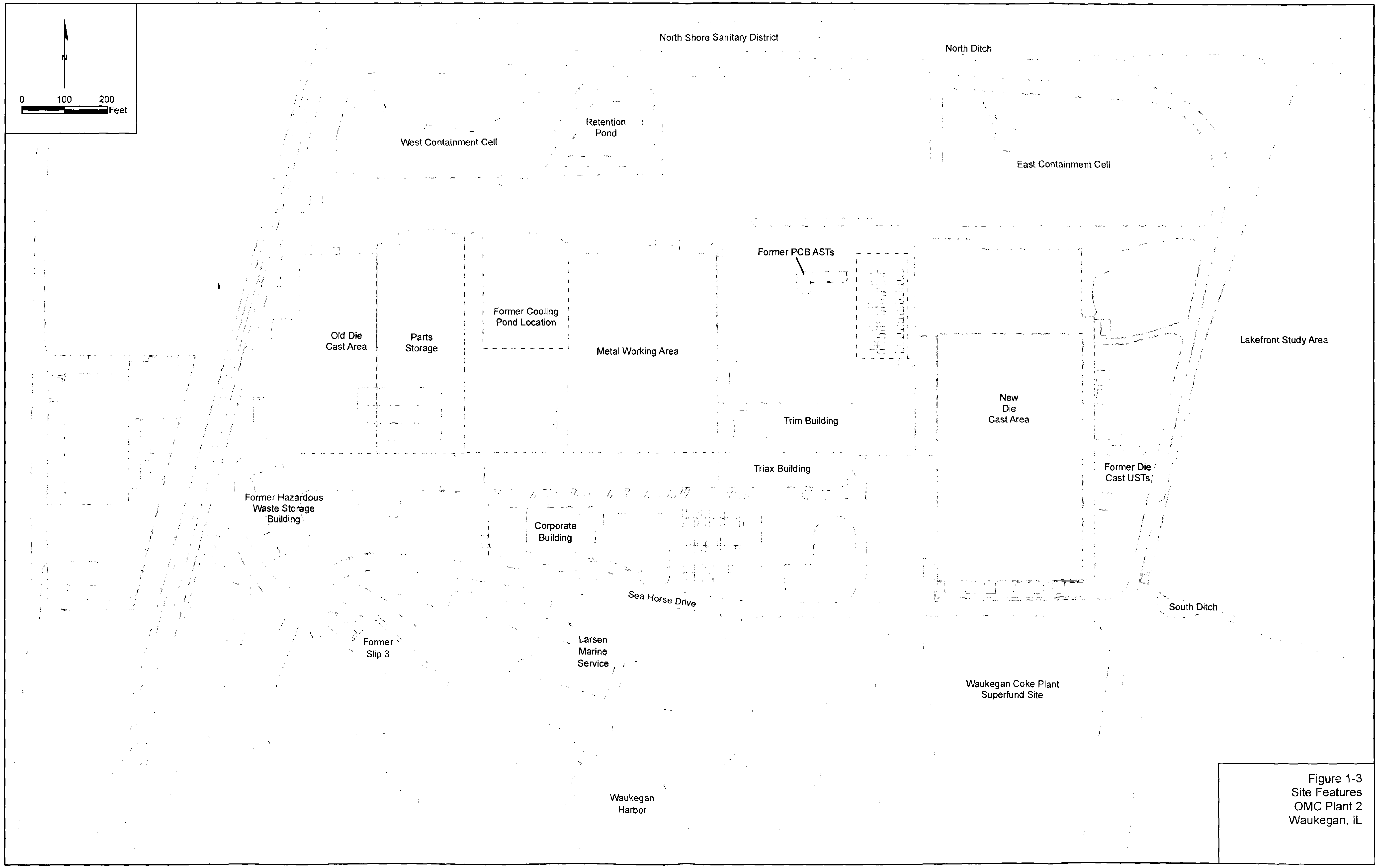
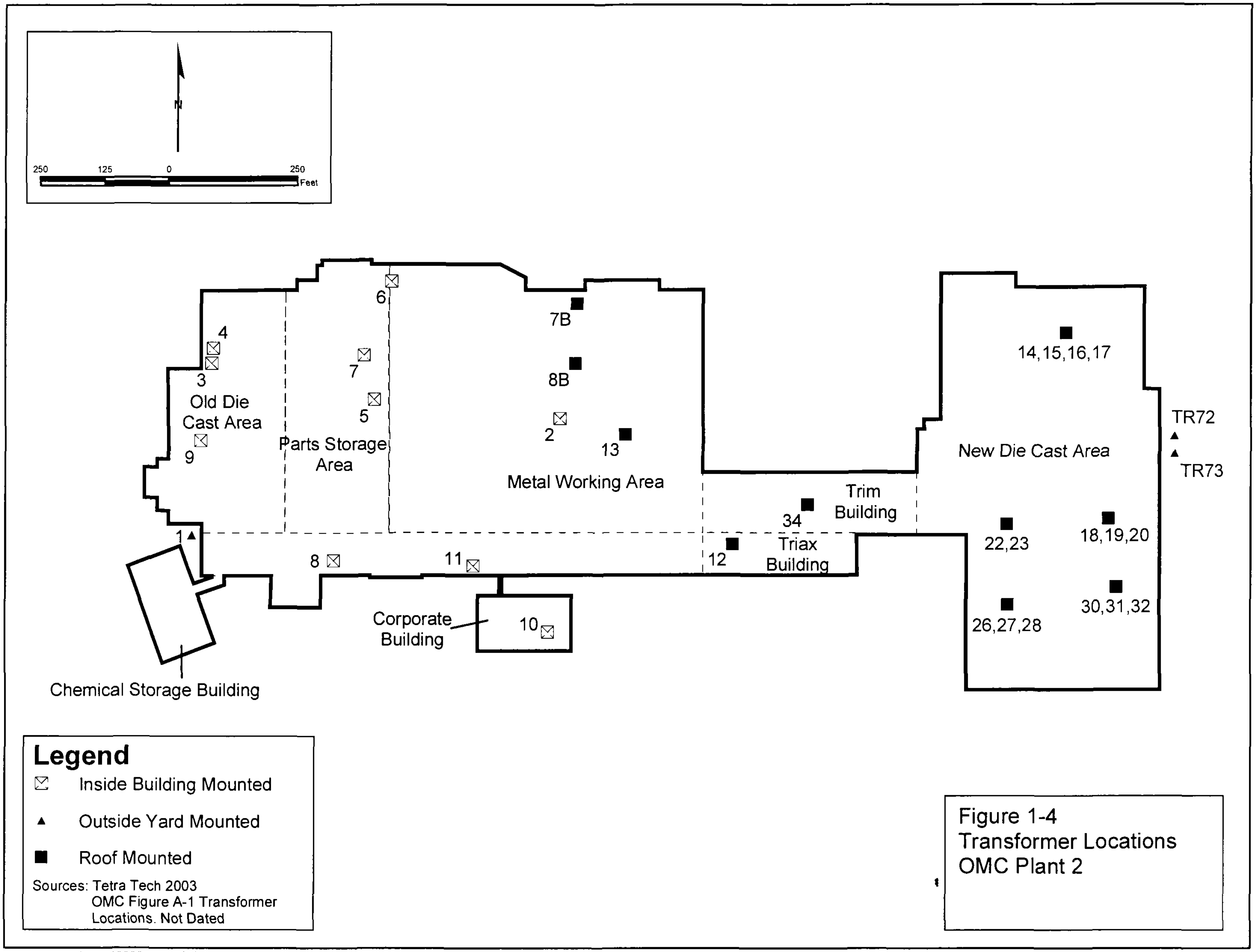
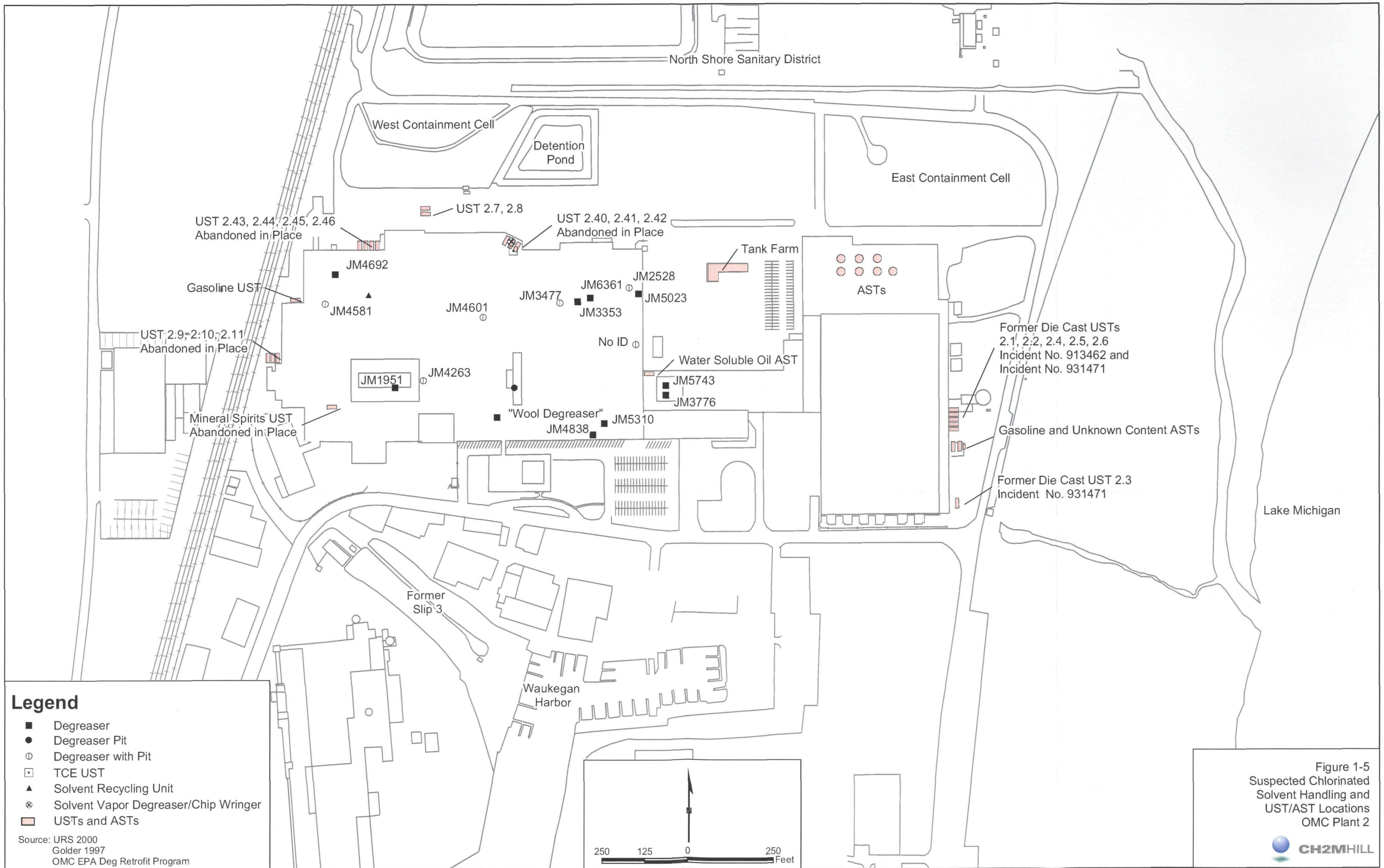


Figure 1-3
Site Features
OMC Plant 2
Waukegan, IL


N
250
125
0
250
Feet
6
4
7B
7
3
8B
14,15,16,17
Old Die
Cast Area
5
2
TR72
9
Parts Storage
Area
13
New Die Cast Area
TR73
Metal Working Area
Trim
Building
34
1
Triax
Building
22,23
18,19,20
8
11
12
Corporate
Building
10
26,27,28
30,31,32
Chemical Storage Building
Legend
Inside Building Mounted
Outside Yard Mounted
Roof Mounted
Sources: Tetra Tech 2003
OMC Figure A-1 Transformer
Locations. Not Dated
Figure 1-4
Transformer Locations
OMC Plant 2



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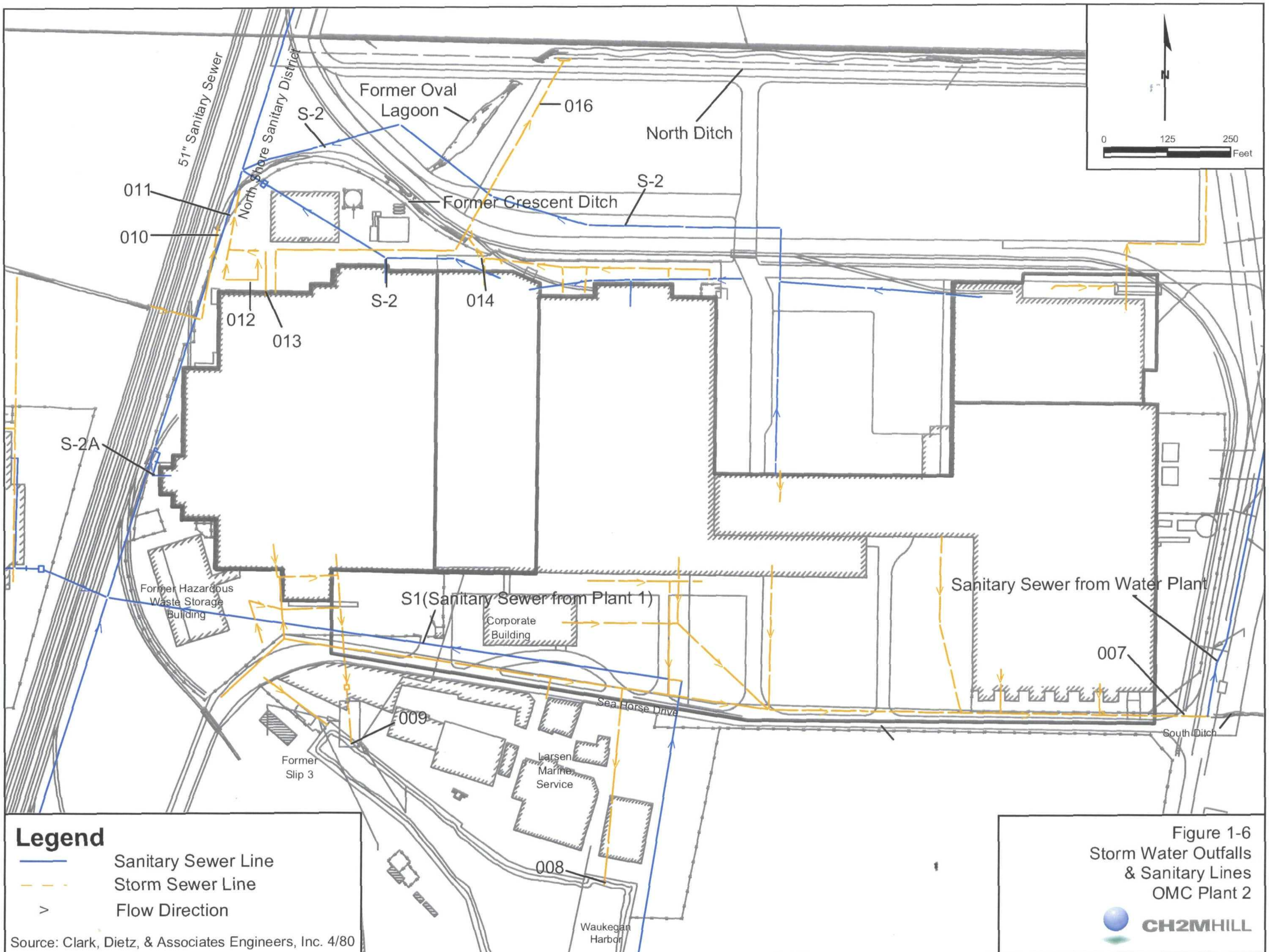

Figure 1-6
Storm Water Outfalls
& Sanitary Lines
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\Remedial Investigation Report 2006\Figure1-6_outfall_locations.mxd, Date: 04 24, 2006 10:23:31 AM, User: JHANSEN1

LEGEND

OMC Plant 2 Building Outline

North

Source:
Waukegan Lakefront-Downtown Master Plan/Urban Design Plan (Skidmore, Owings & Merrill LLP, June 23, 2003)

Figure 2-1
Plan for Harborfront and North Harbor Development Districts
OMC Plant 2

CH2MHILL

E082005021MKE Figure2-1_Harborfront_v5.ai 4-24-06 jls/tll

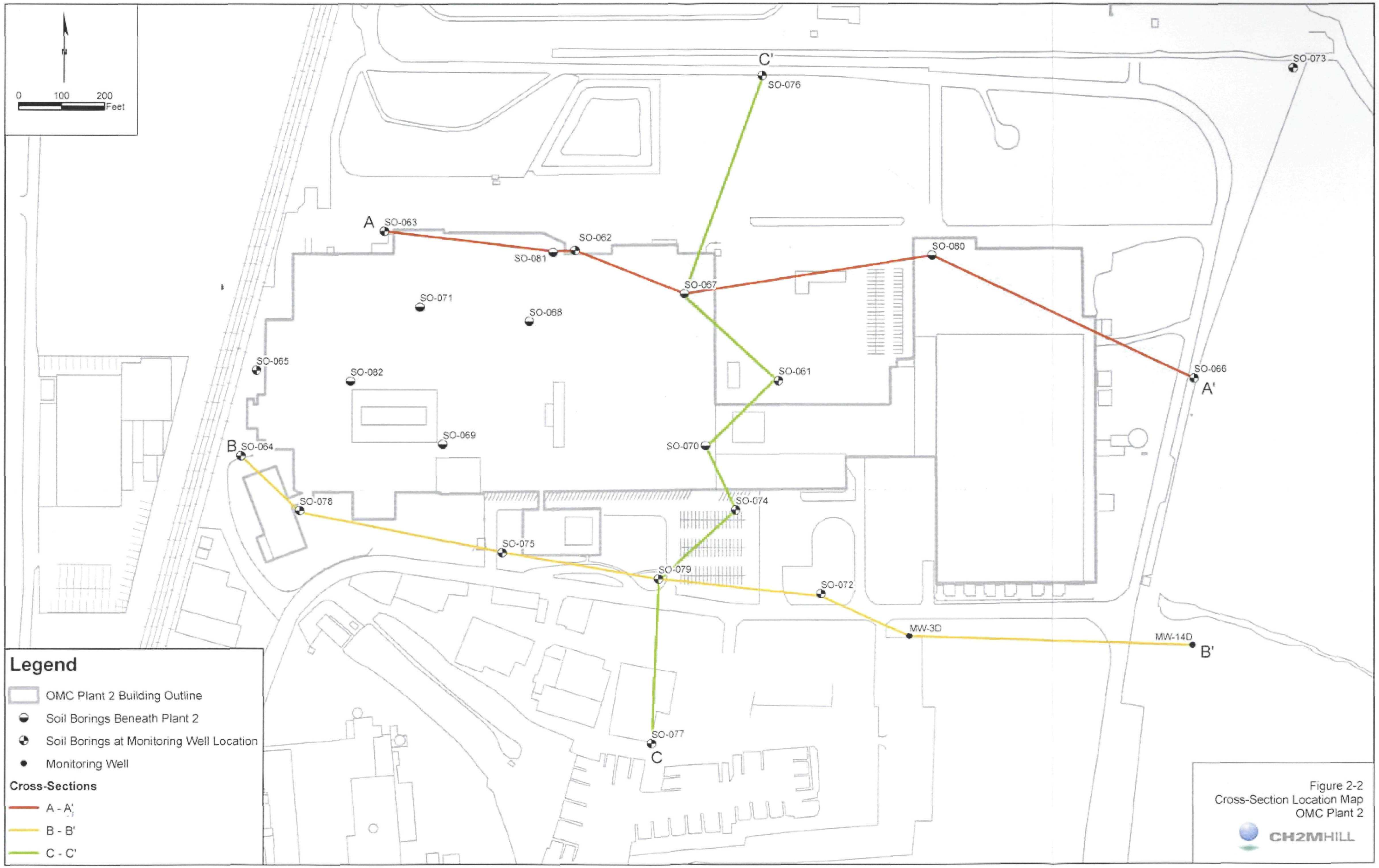

Figure 2-2
Cross-Section Location Map
OMC Plant 2

CH2MHILL

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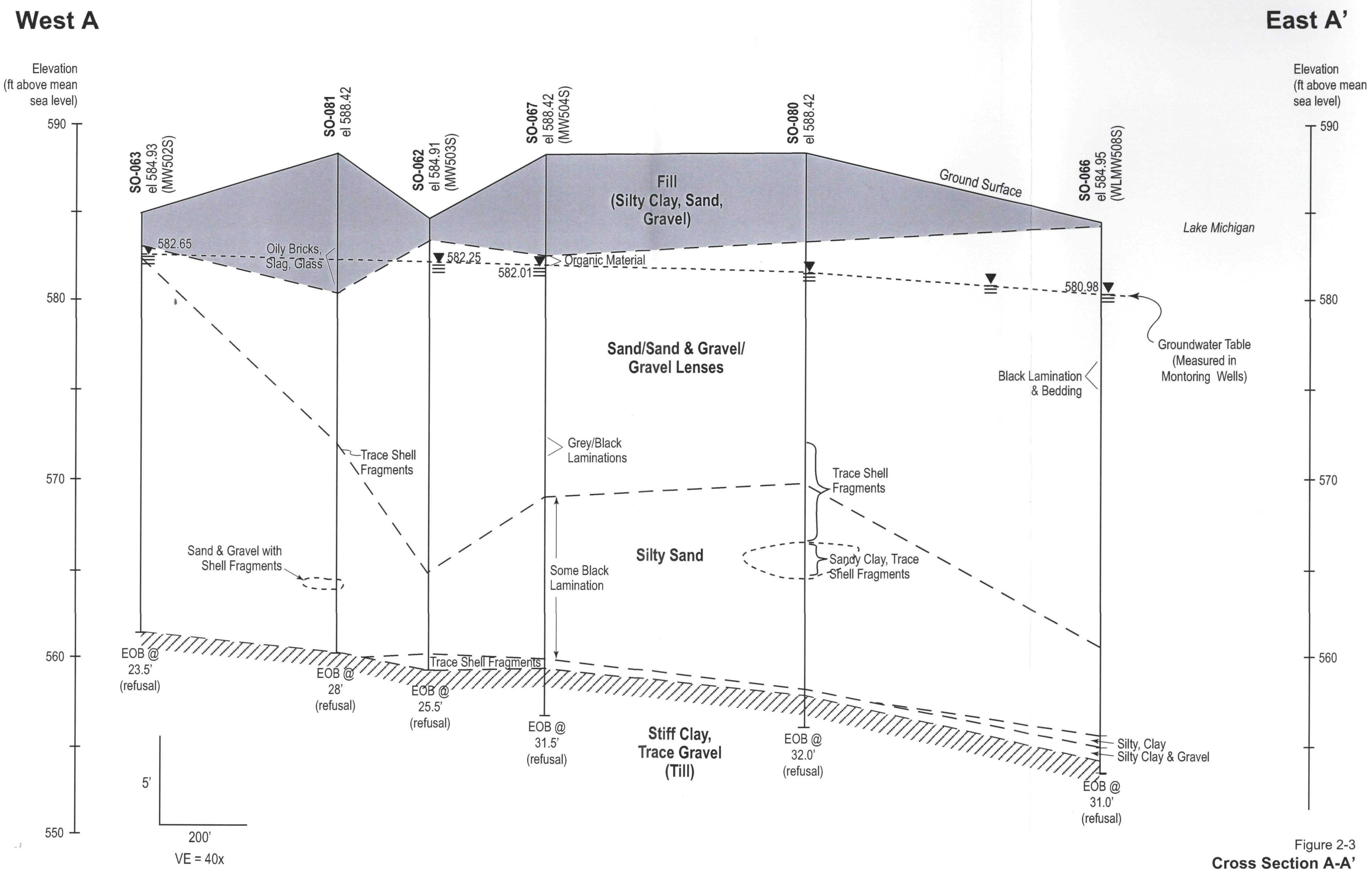

Figure 2-3
Cross Section A-A'
OMC Plant 2
CH2MHILL

E082005021MKE X-sec A-A'_v2.ai 9-27-05|jls

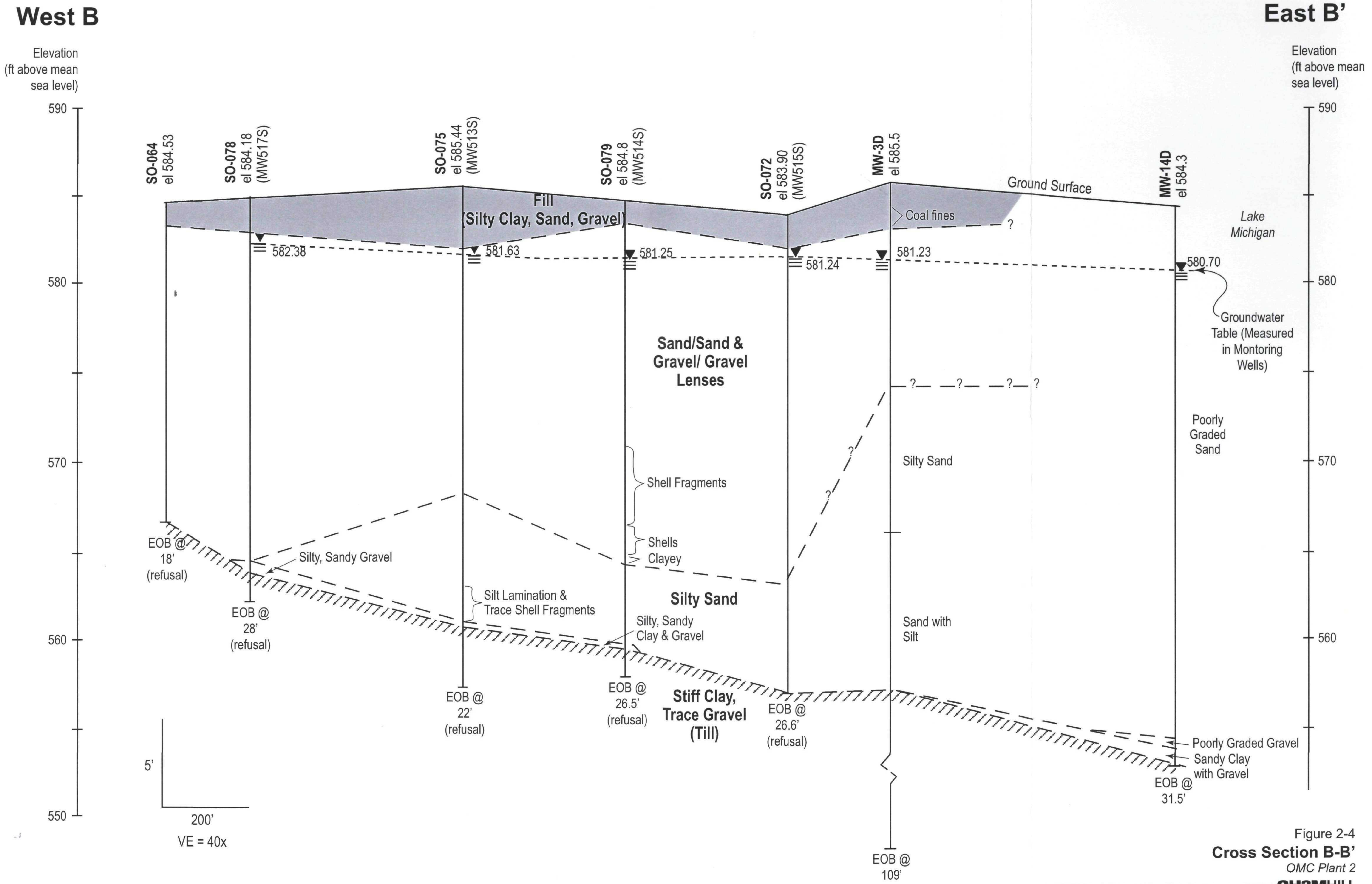

Figure 2-4
Cross Section B-B'
OMC Plant 2
CH2MHILL

E082005021MKE X-sec B-B'_v2.ai 9-27-05tl/jls

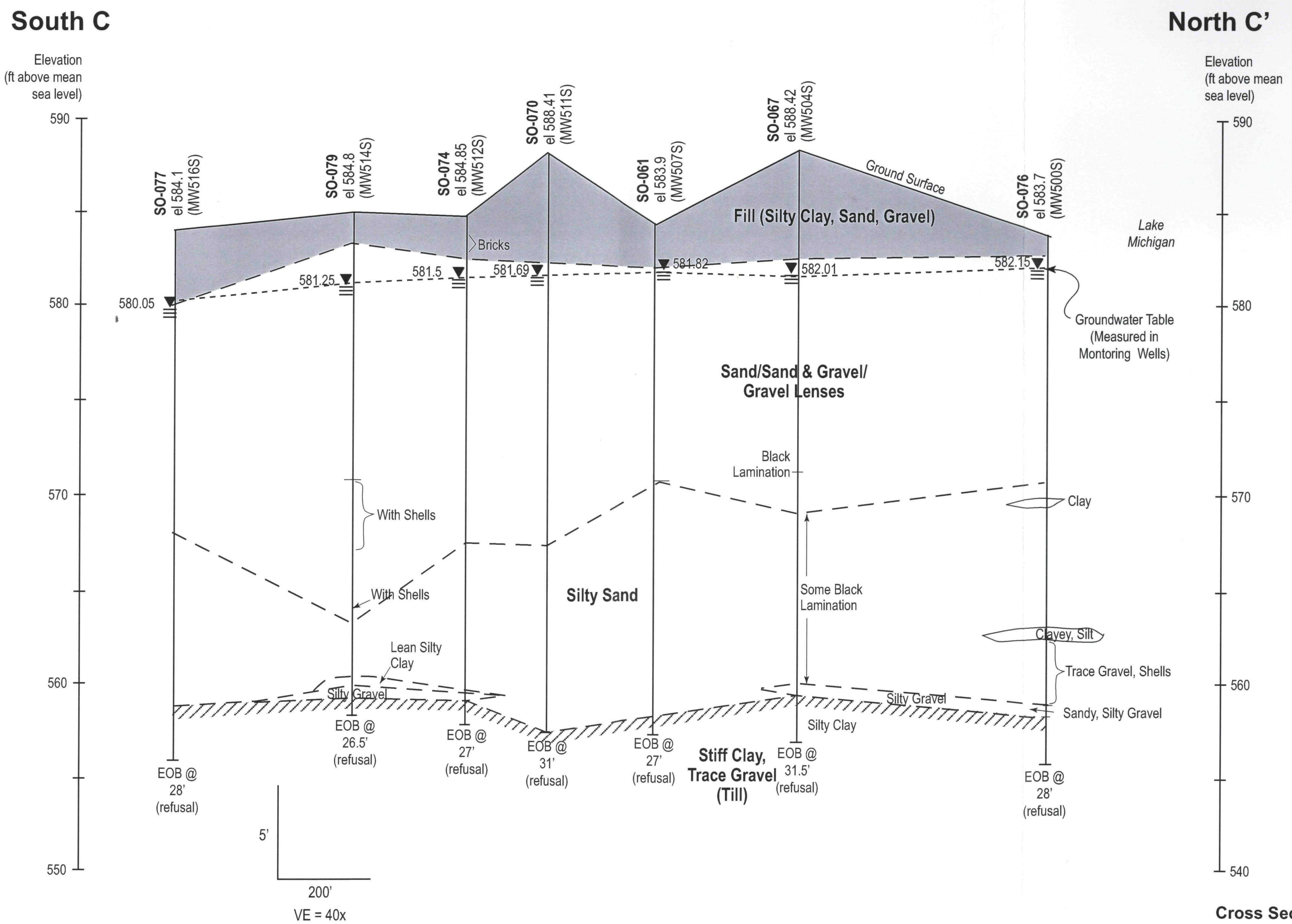

Figure 2-5
Cross Section C-C'
OMC Plant 2
CH2MHILL

E082005021MKE X-sec C-C'_v2.ai 10-12-05tl

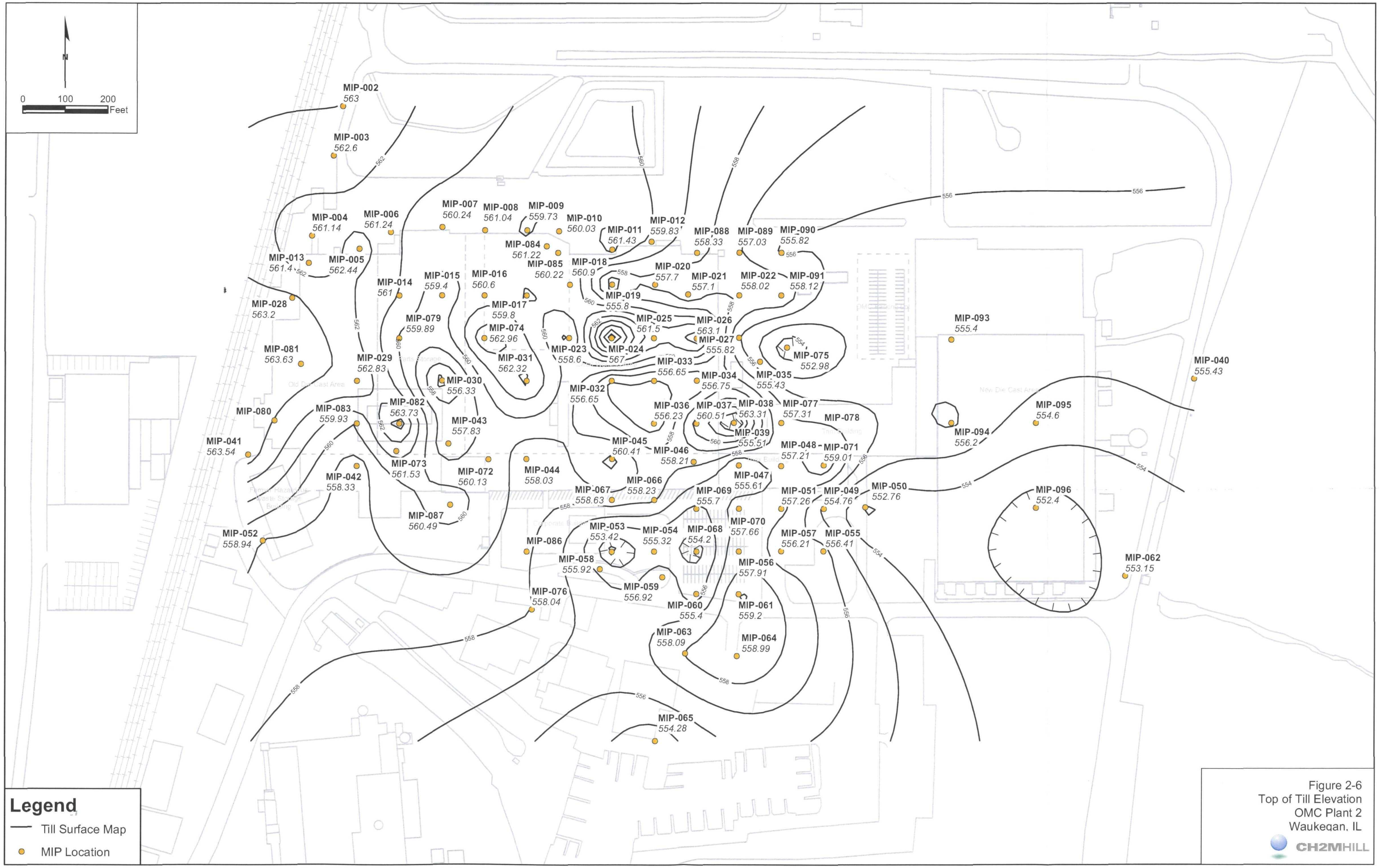

Figure 2-6
Top of Till Elevation
OMC Plant 2
Waukegan, IL

CH2MHILL

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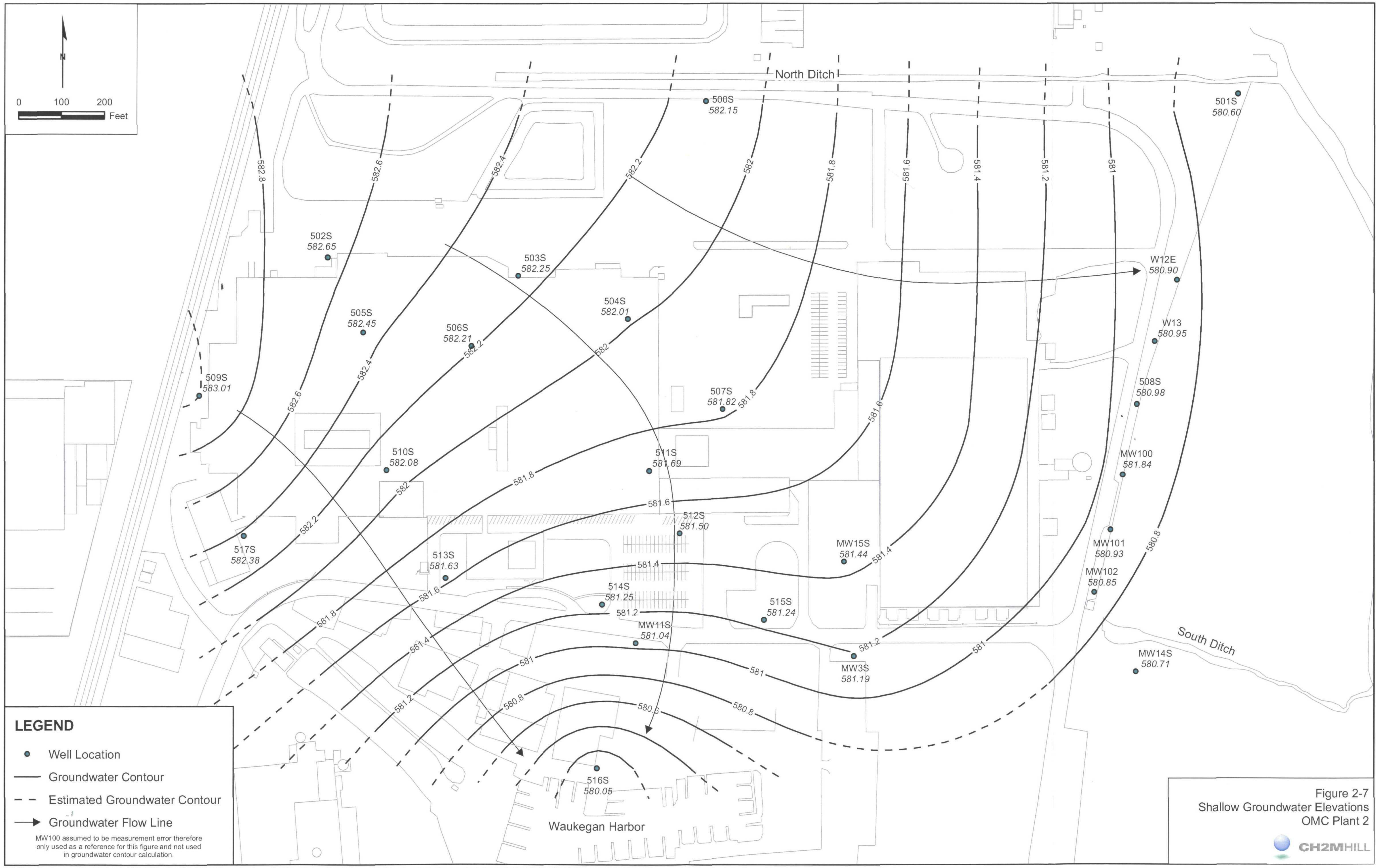

Figure 2-7
Shallow Groundwater Elevations
OMC Plant 2

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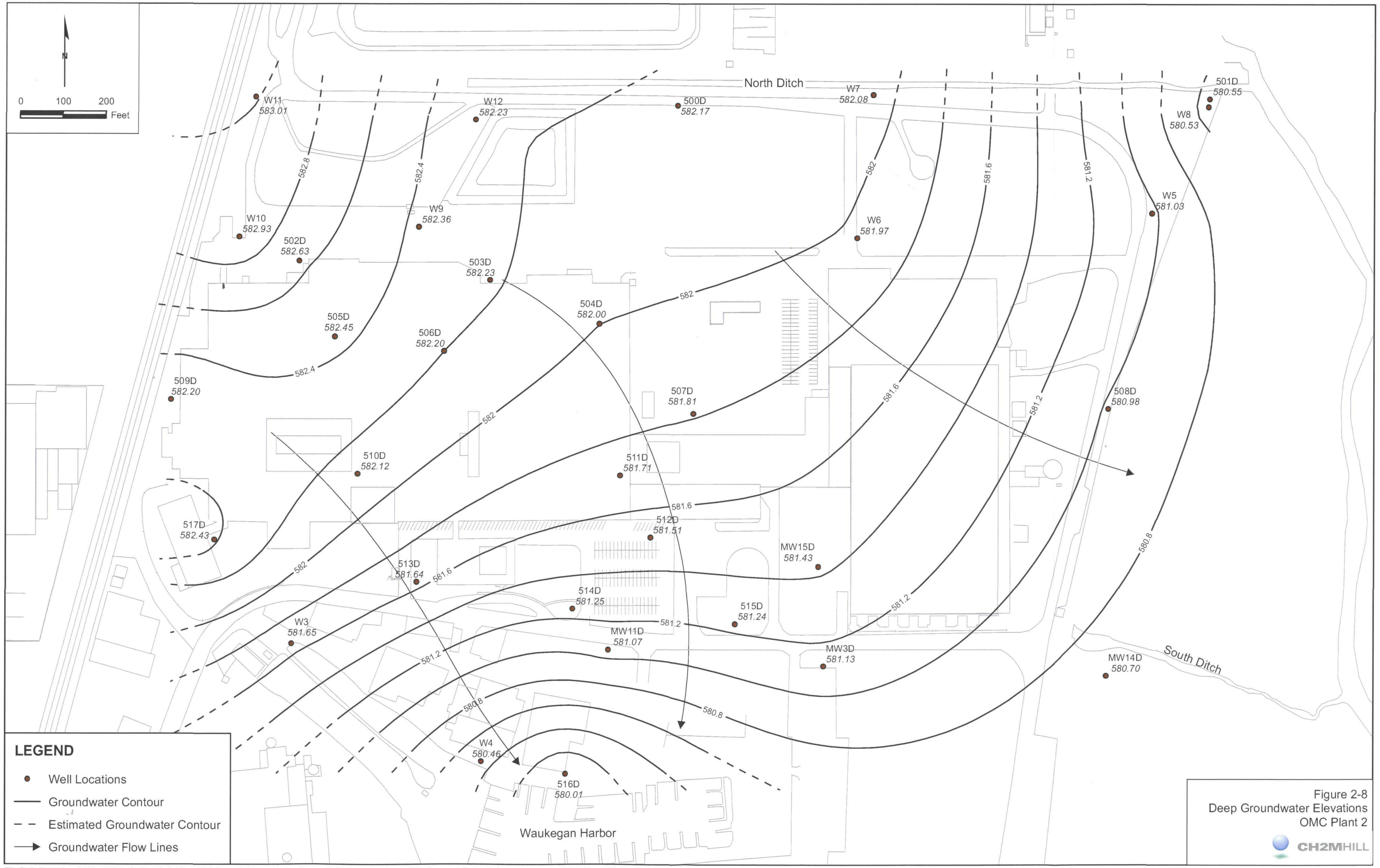

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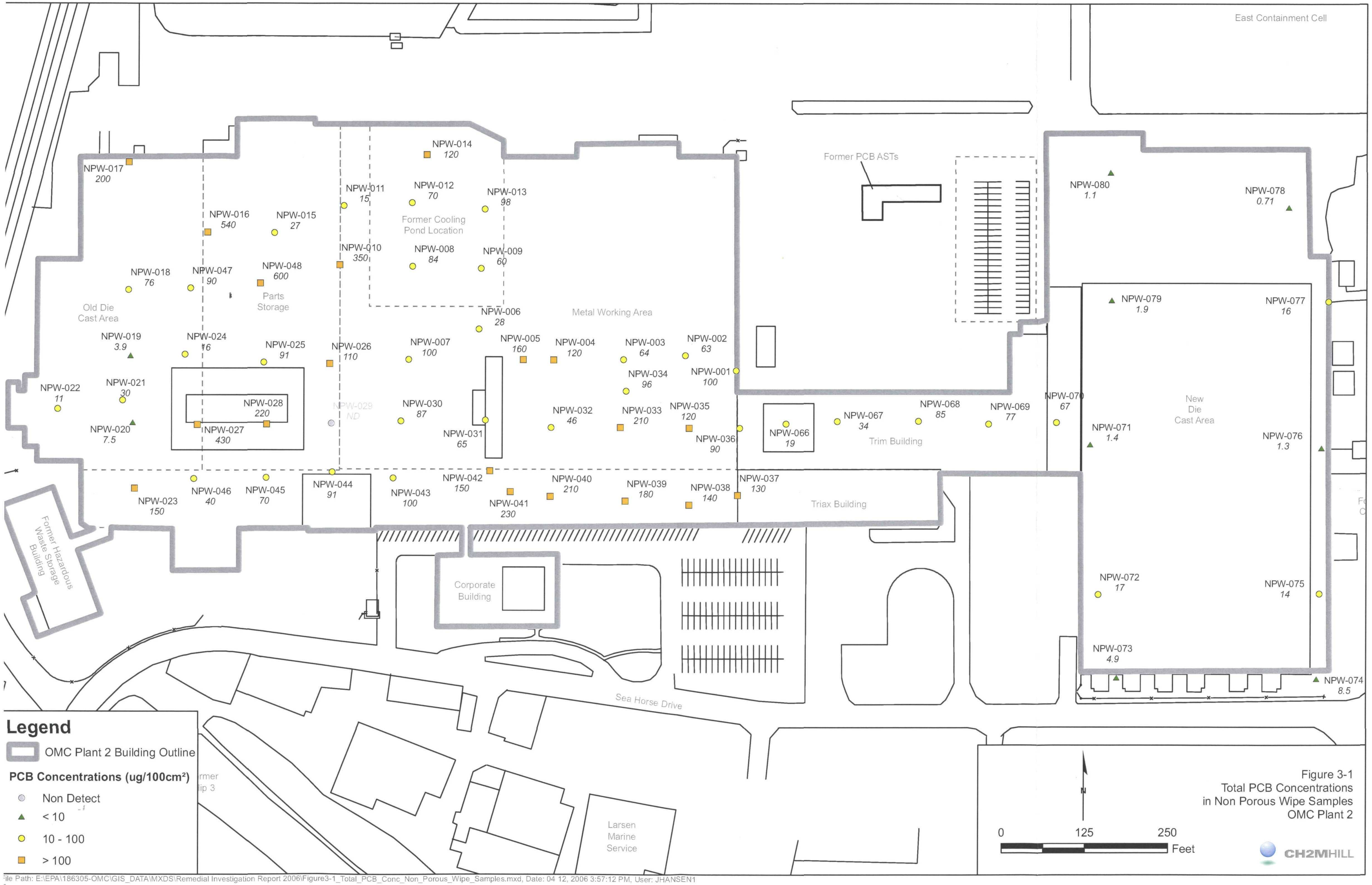

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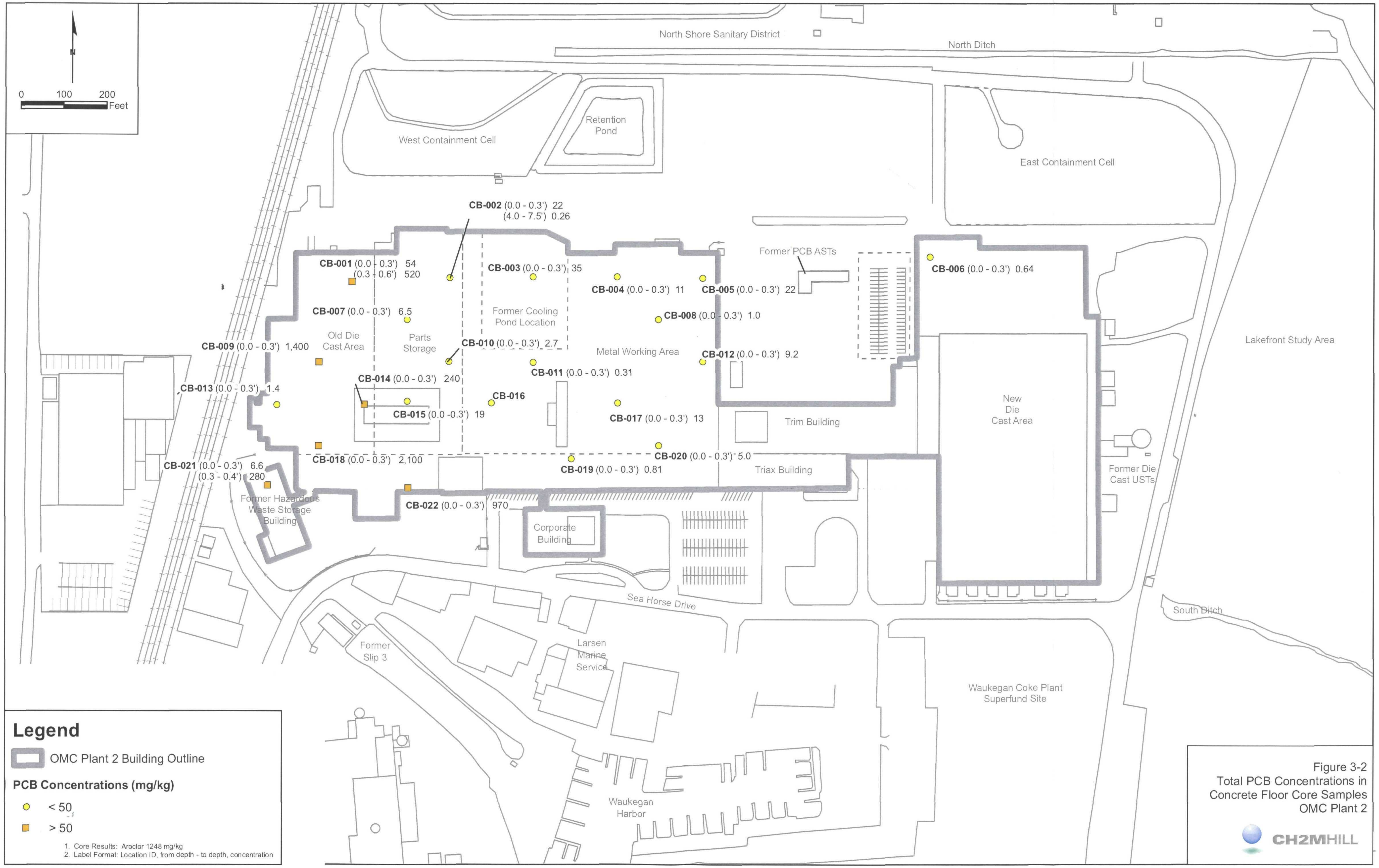

Figure 3-2
Total PCB Concentrations in Concrete Floor Core Samples
OMC Plant 2

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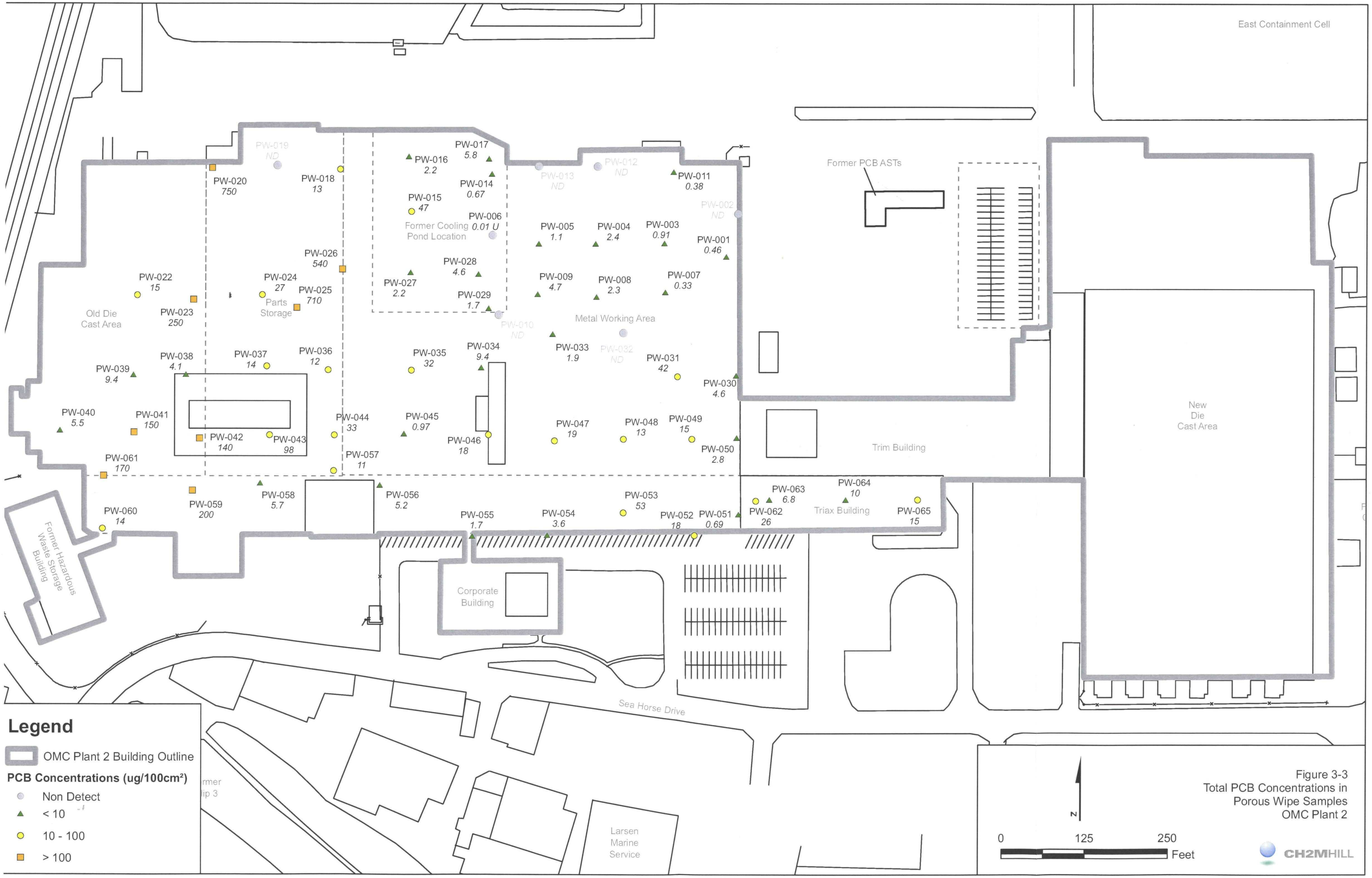

Figure 3-3
Total PCB Concentrations in Porous Wipe Samples
OMC Plant 2

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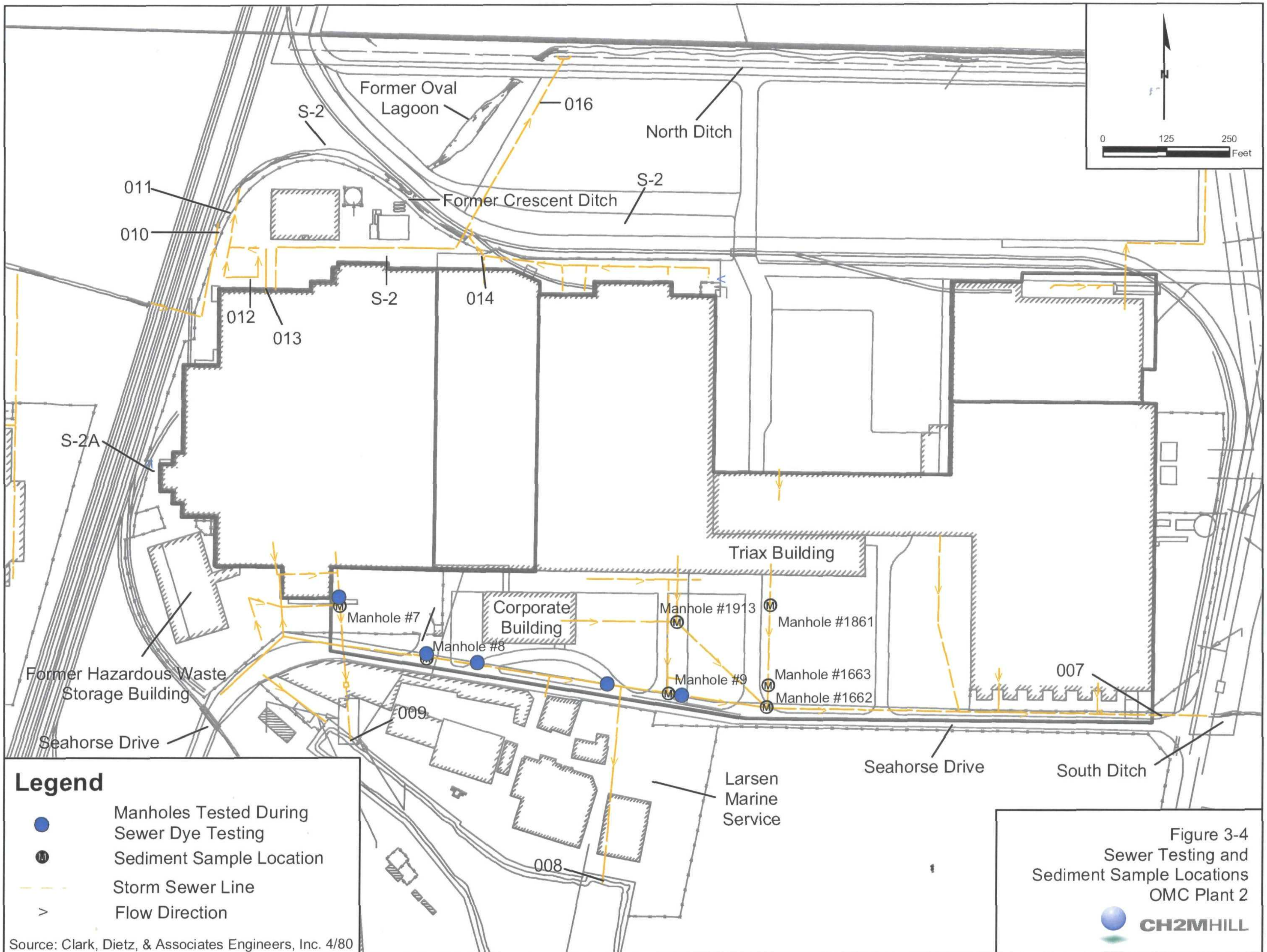

Figure 3-4
Sewer Testing and
Sediment Sample Locations
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\Remedial Investigation Report 2006\Figure3-4_Sewer_Testing_a.mxd, Date: 04 21, 2006 11:00:28 AM, User: JHANSEN1

Figure 3-5
PID Detector Response (> 200,000 uV)
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-7_3D_ECD_Response.mxd, Date: October 12, 2005 2:29:44 PM, User: JHANSEN1

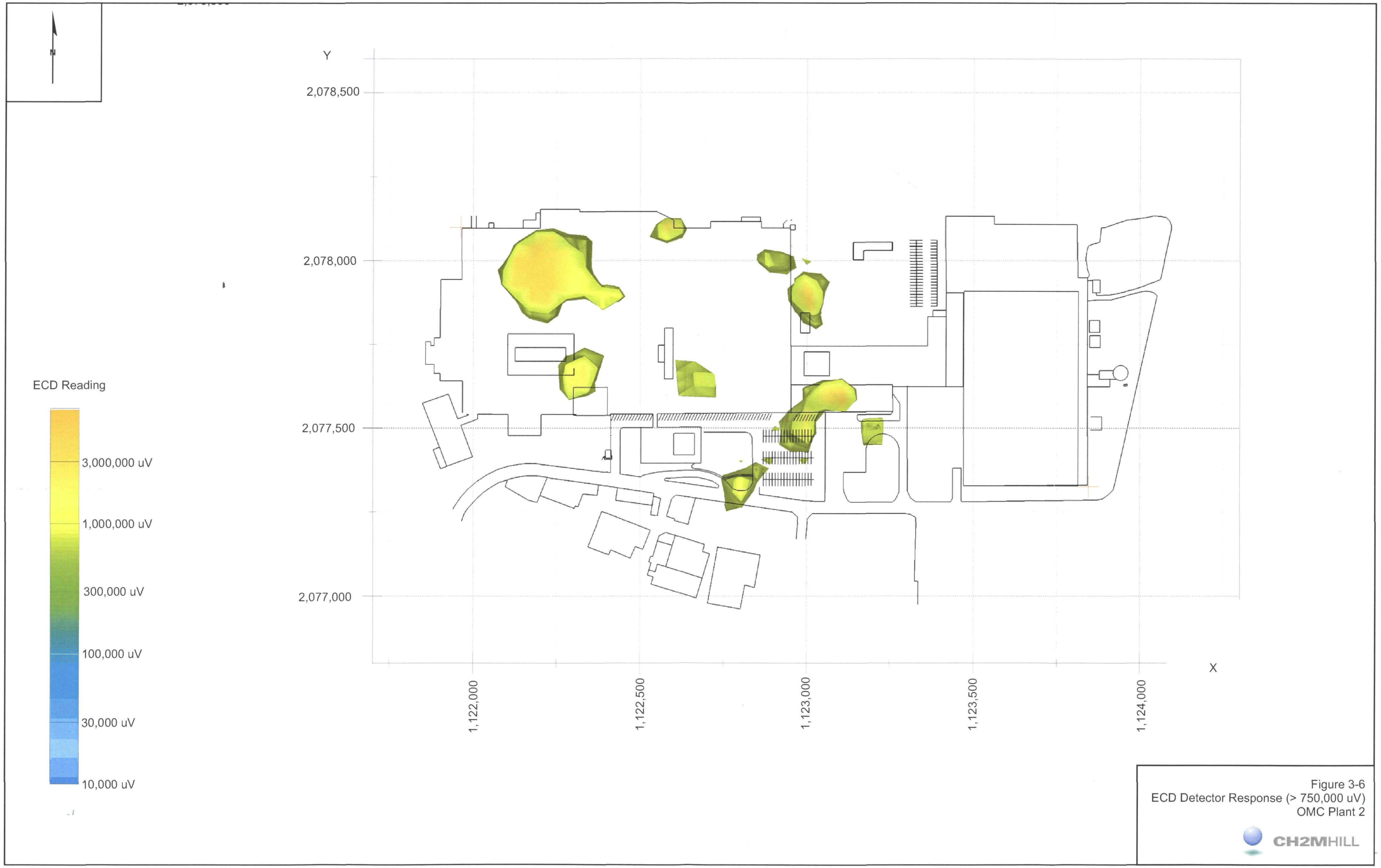

Figure 3-6
ECD Detector Response (> 750,000 uV)
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-6_ECD_Response.mxd, Date: October 13, 2005 2:19:34 PM, User: JHANSEN1

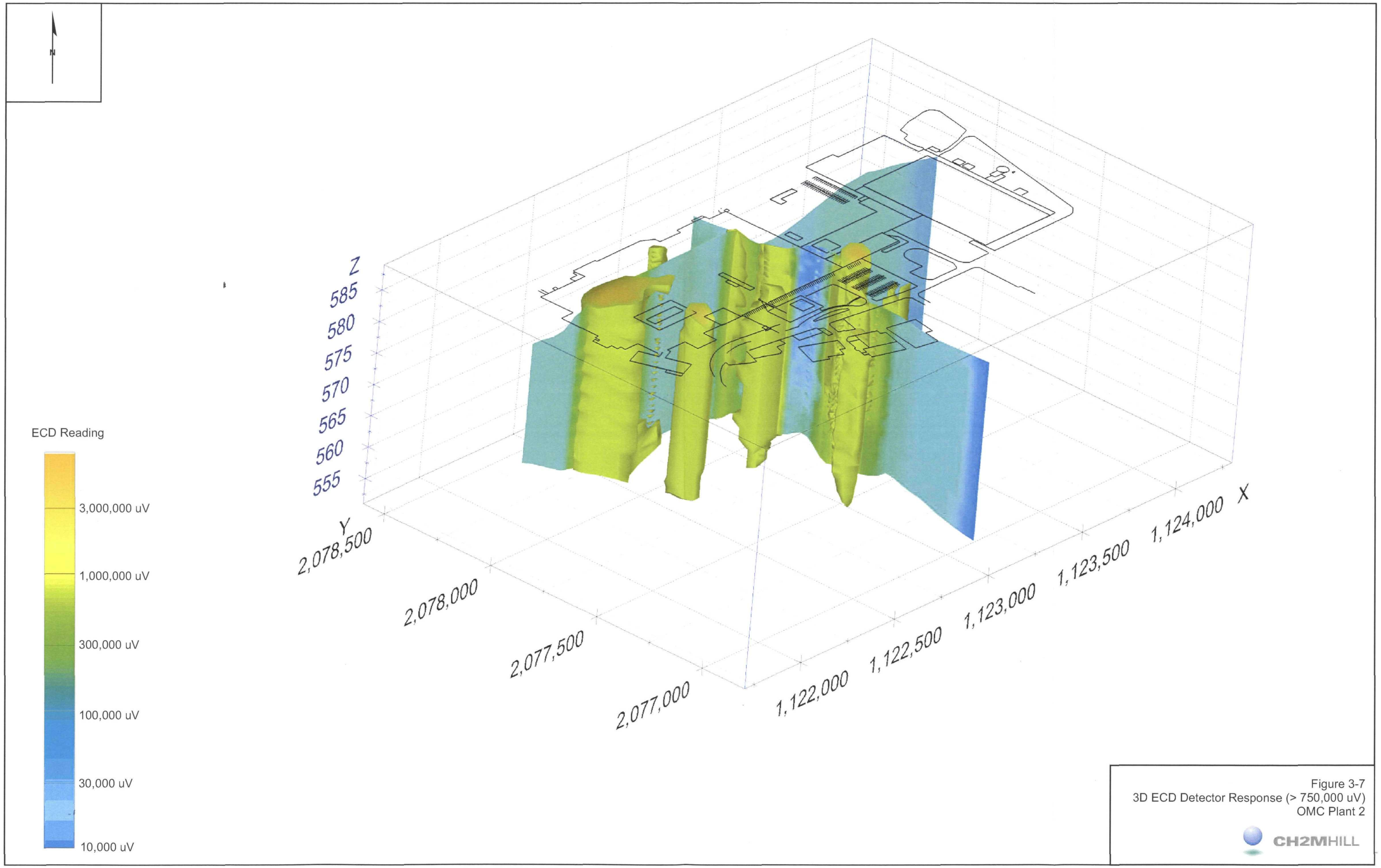

Figure 3-7
3D ECD Detector Response (> 750,000 uV)
OMC Plant 2

CH2MHILL

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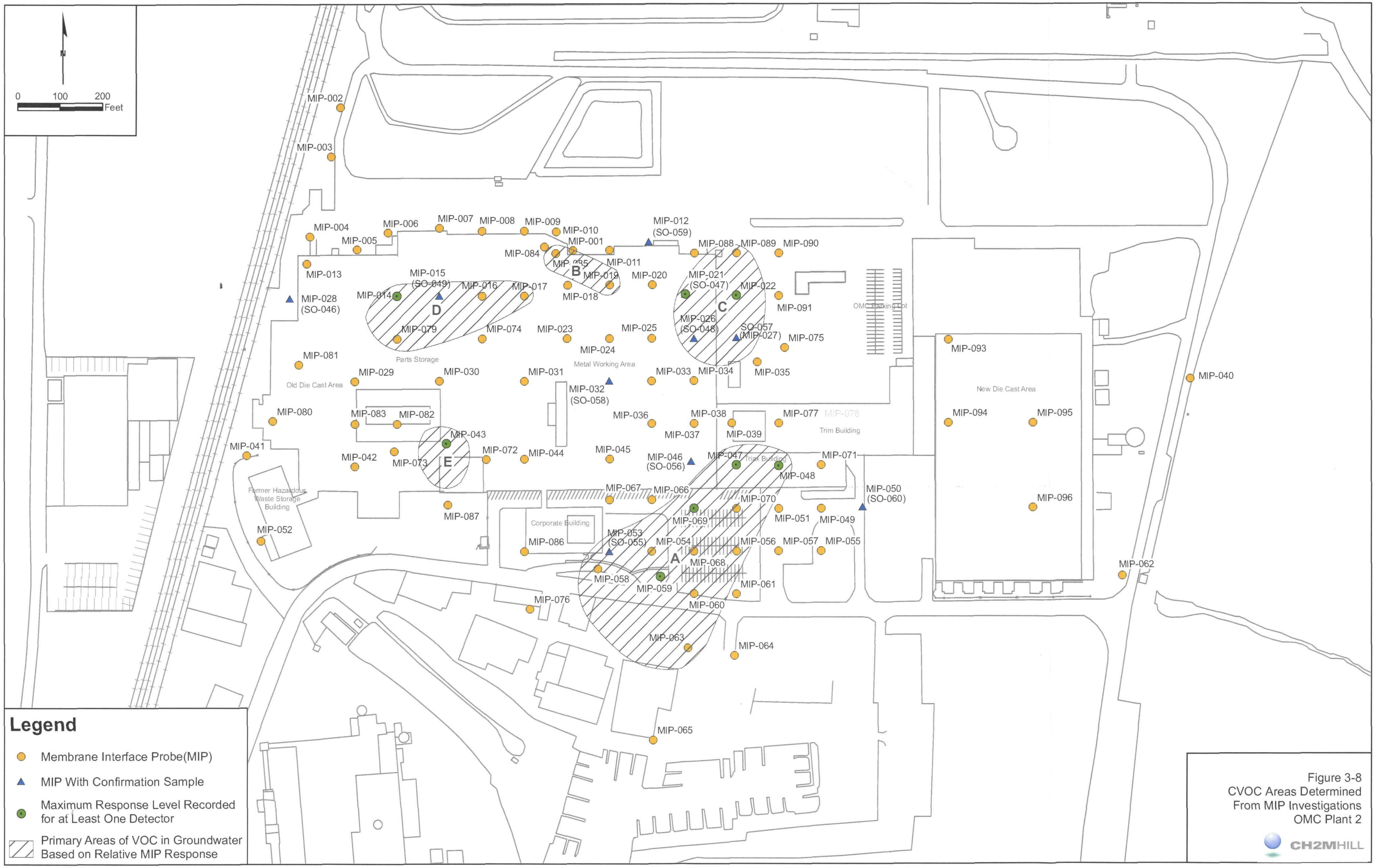

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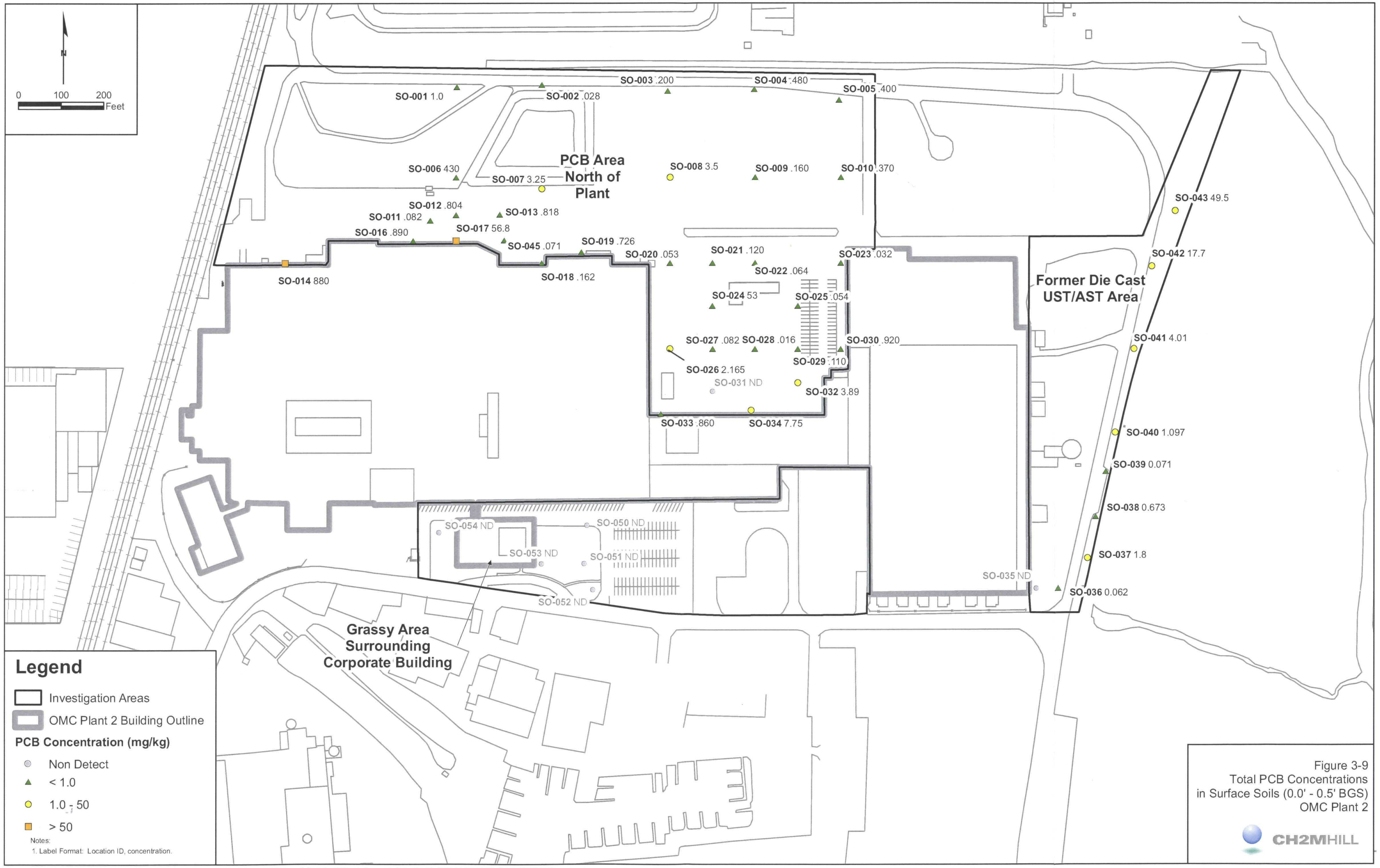

Figure 3-9
Total PCB Concentrations
in Surface Soils (0.0' - 0.5' BGS)
OMC Plant 2

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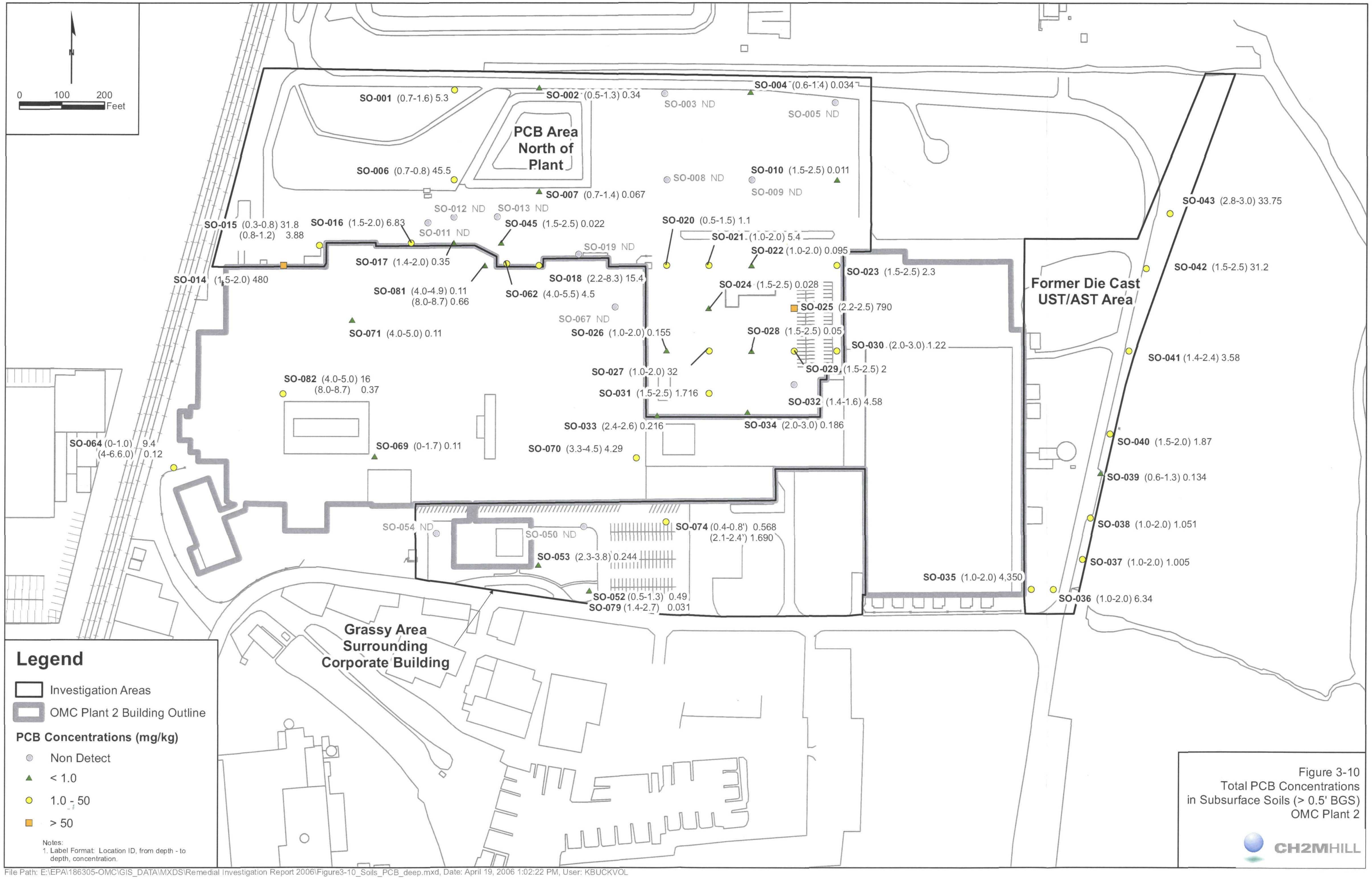

Figure 3-10
Total PCB Concentrations
in Subsurface Soils (> 0.5' BGS)
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\Remedial Investigation Report 2006\Figure3-10_Soils_PCB_deep.mxd, Date: April 19, 2006 1:02:22 PM, User: KBUCKVOL

Figure 3-11
Total PCB Concentrations
in Soils Lakefront Study Area
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\Remedial Investigation Report 2006\Figure3-11_Soils_City_PCB_deep.mxd, Date: April 19, 2006 1:02:46 PM, User: KBUCKVOL

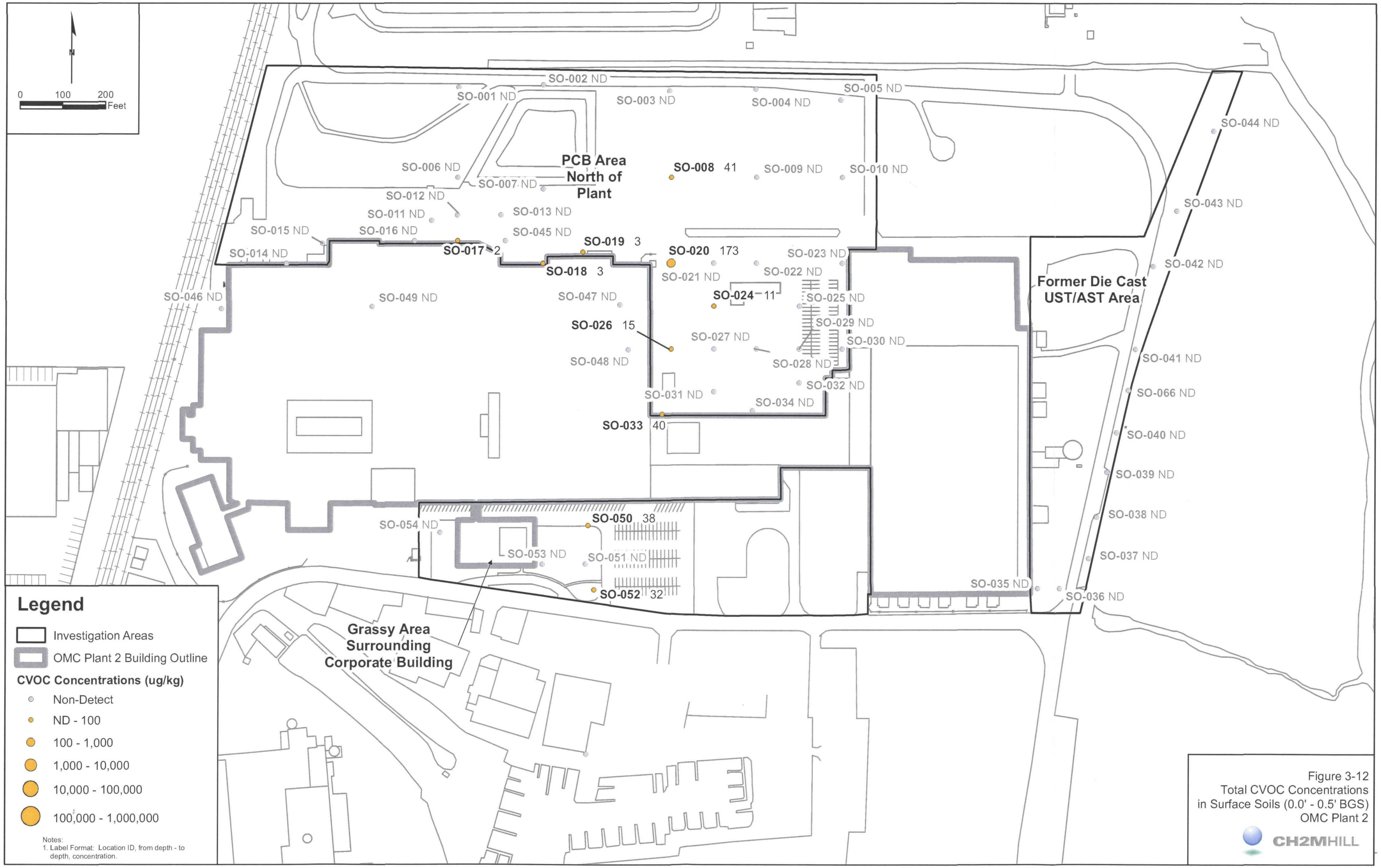

Figure 3-12
Total CVOC Concentrations
in Surface Soils (0.0' - 0.5' BGS)
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-12_Soils_CVOC_shallow.mxd, Date: October 11, 2005 5:59:51 PM, User: JHANSEN1

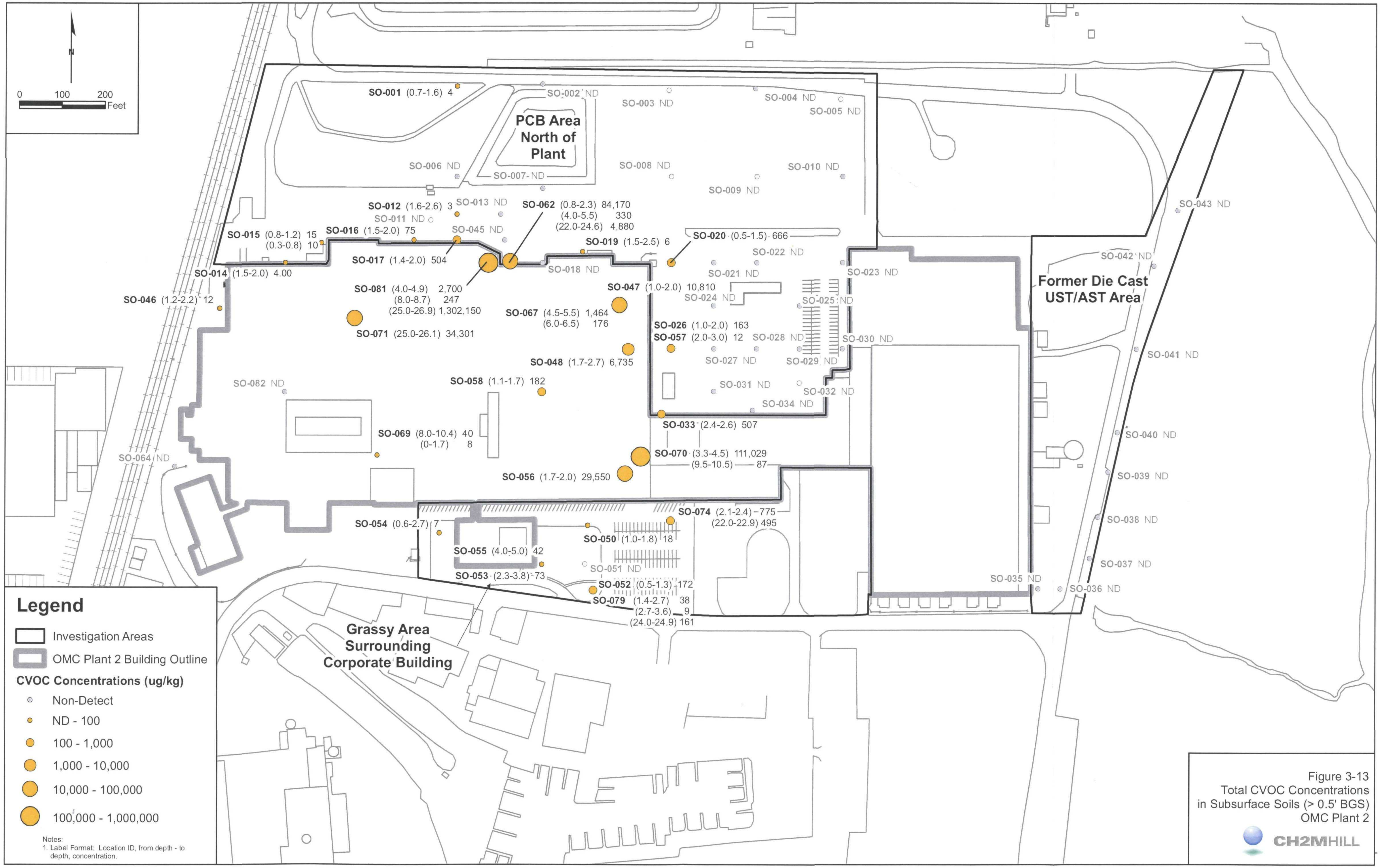

Figure 3-13
Total CVOC Concentrations
in Subsurface Soils (> 0.5' BGS)
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-13_Soils_CVOC_deep.mxd, Date: December 28, 2005 2:11:31 PM, User: JHANSEN1

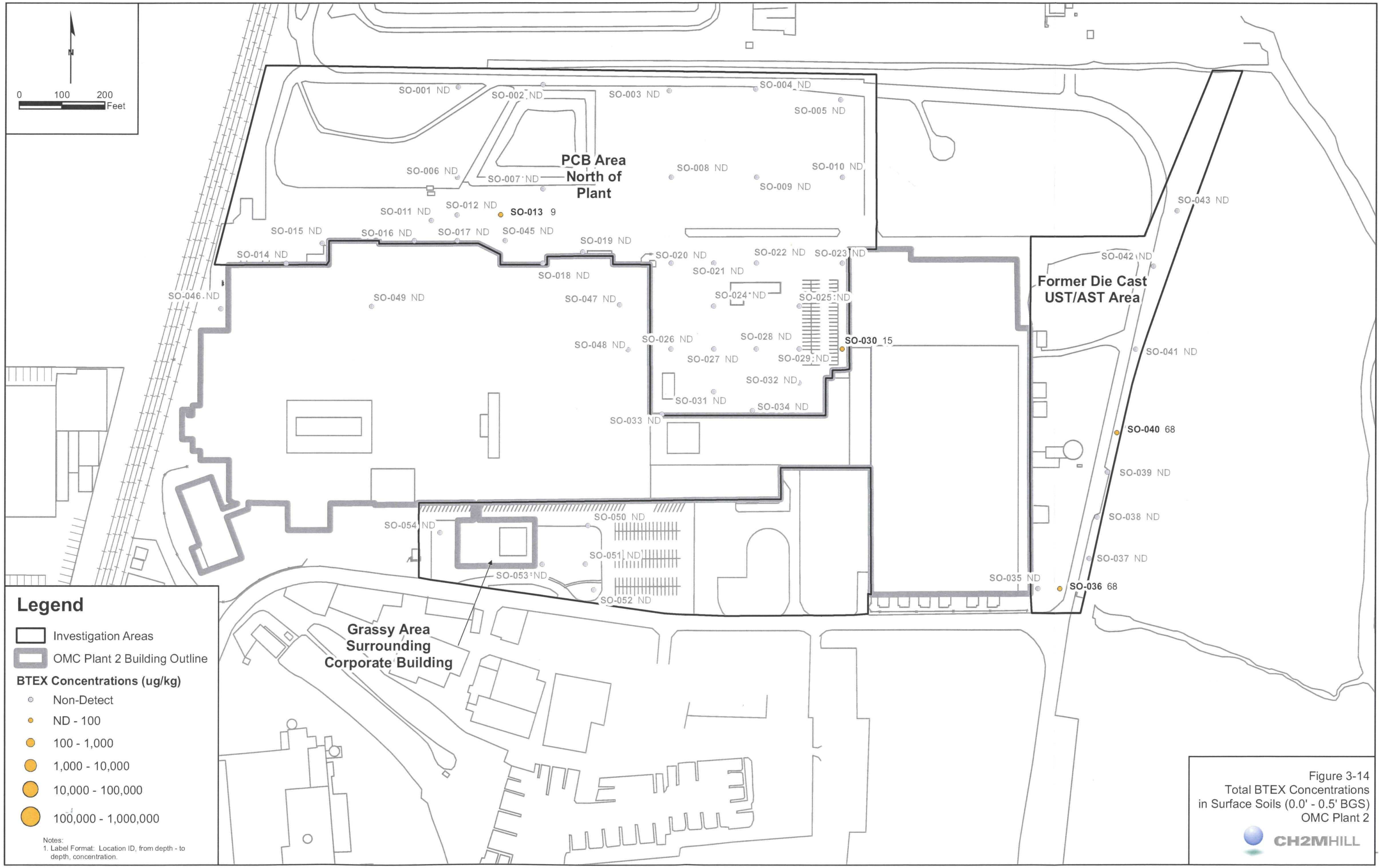

Figure 3-14
Total BTEX Concentrations
in Surface Soils (0.0' - 0.5' BGS)
OMC Plant 2

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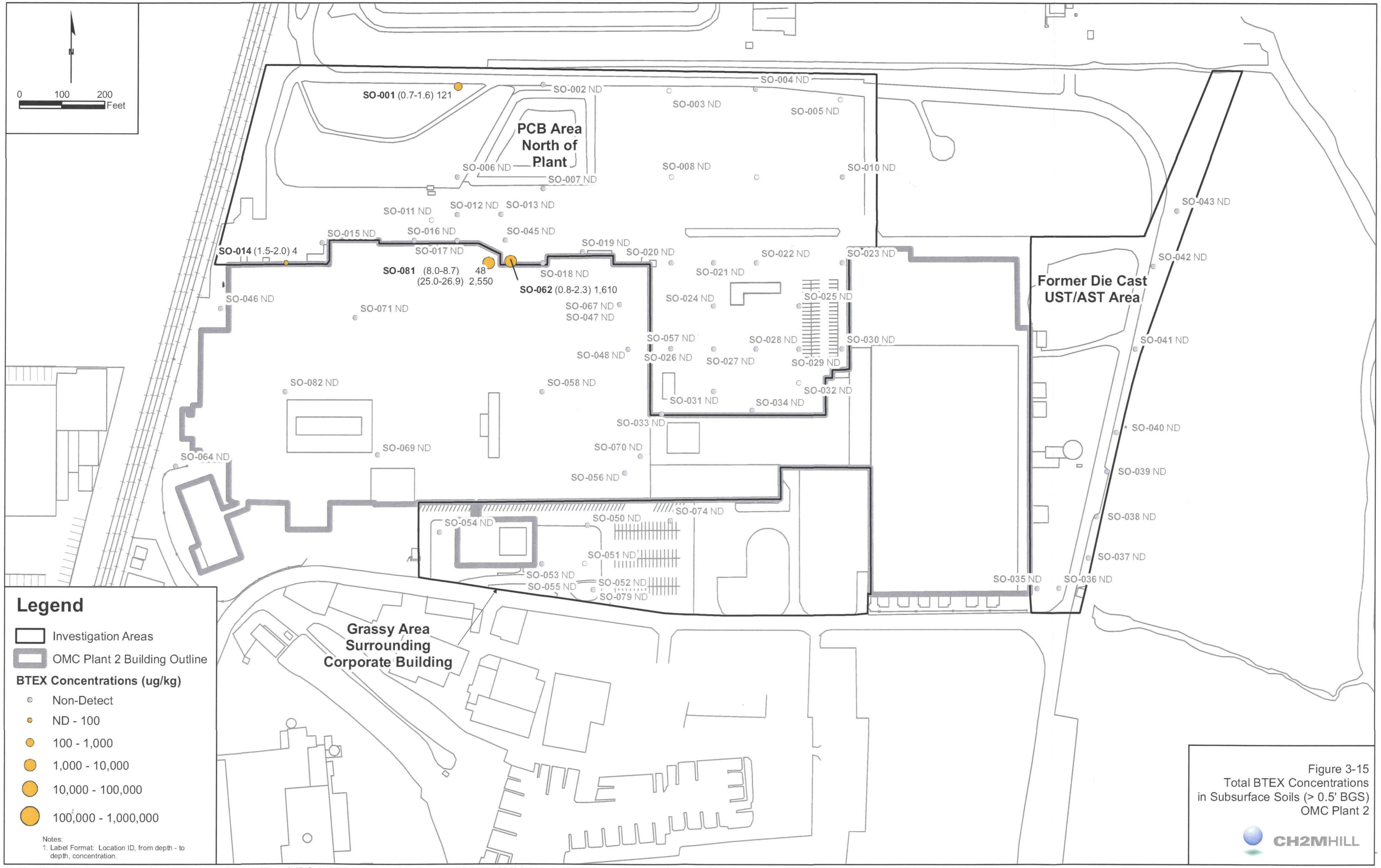

Figure 3-15
Total BTEX Concentrations
in Subsurface Soils (> 0.5' BGS)
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-15_Soils_BTEX_deep.mxd, Date: December 28, 2005 2:30:00 PM, User: JHANSEN1

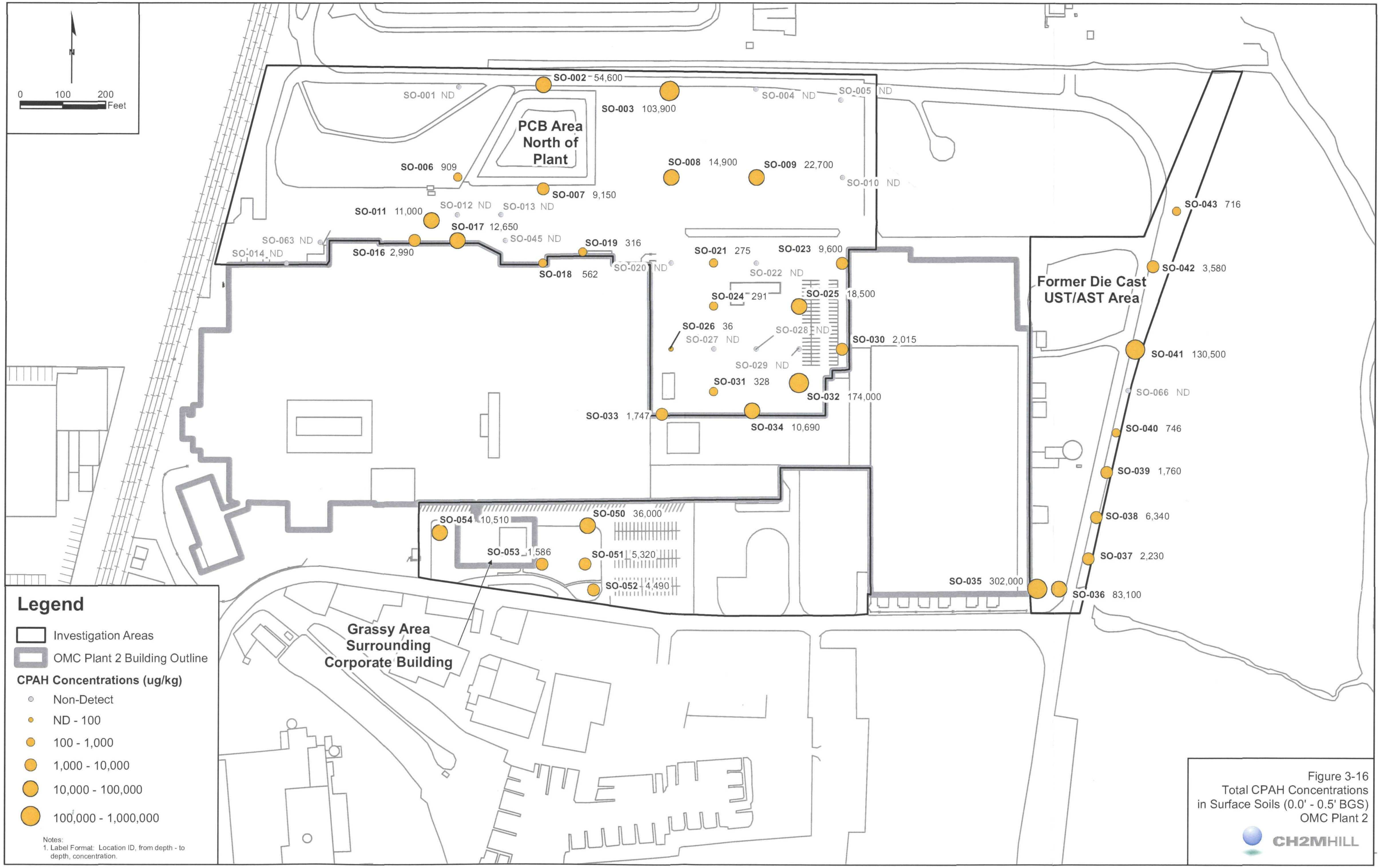

Figure 3-16
Total CPAH Concentrations
in Surface Soils (0.0' - 0.5' BGS)
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-16_Soils_CPAH_shallow.mxd, Date: October 12, 2005 8:28:12 AM, User: JHANSEN1

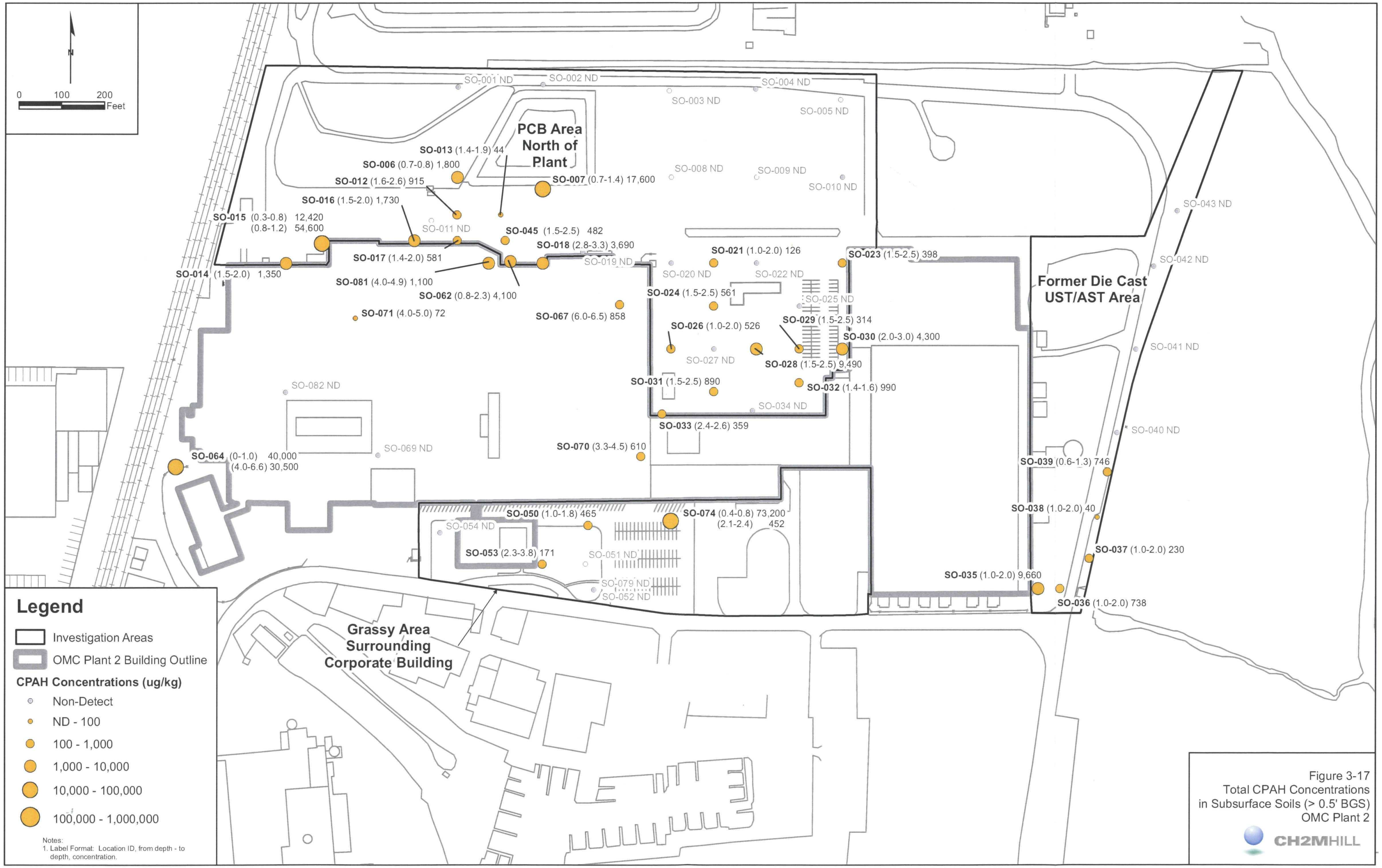

Figure 3-17
Total CPAH Concentrations
in Subsurface Soils (> 0.5' BGS)
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-17_Soils_CPAH_deep.mxd, Date: October 12, 2005 9:18:59 AM, User: JHANSEN1

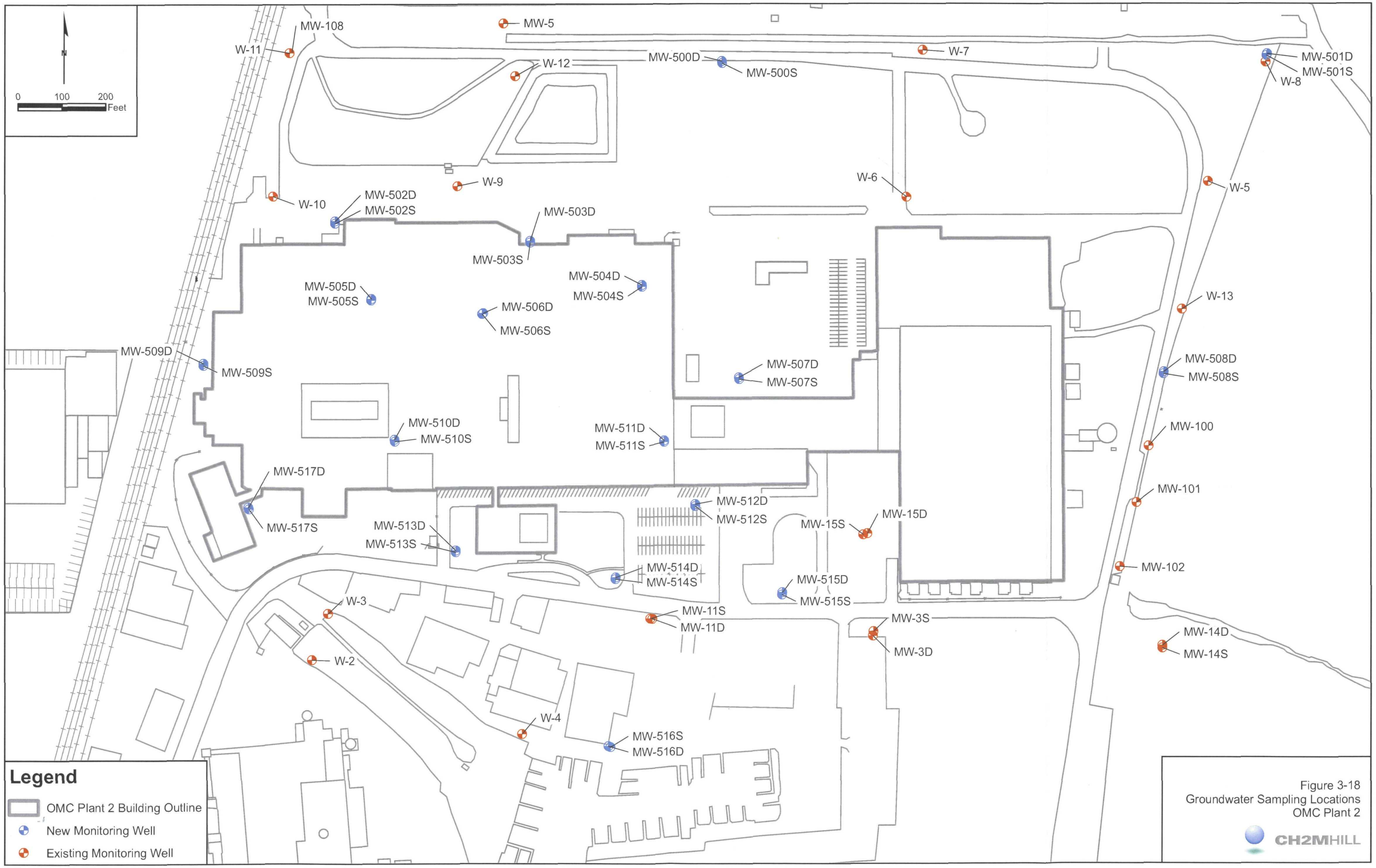

Figure 3-18
Groundwater Sampling Locations
OMC Plant 2

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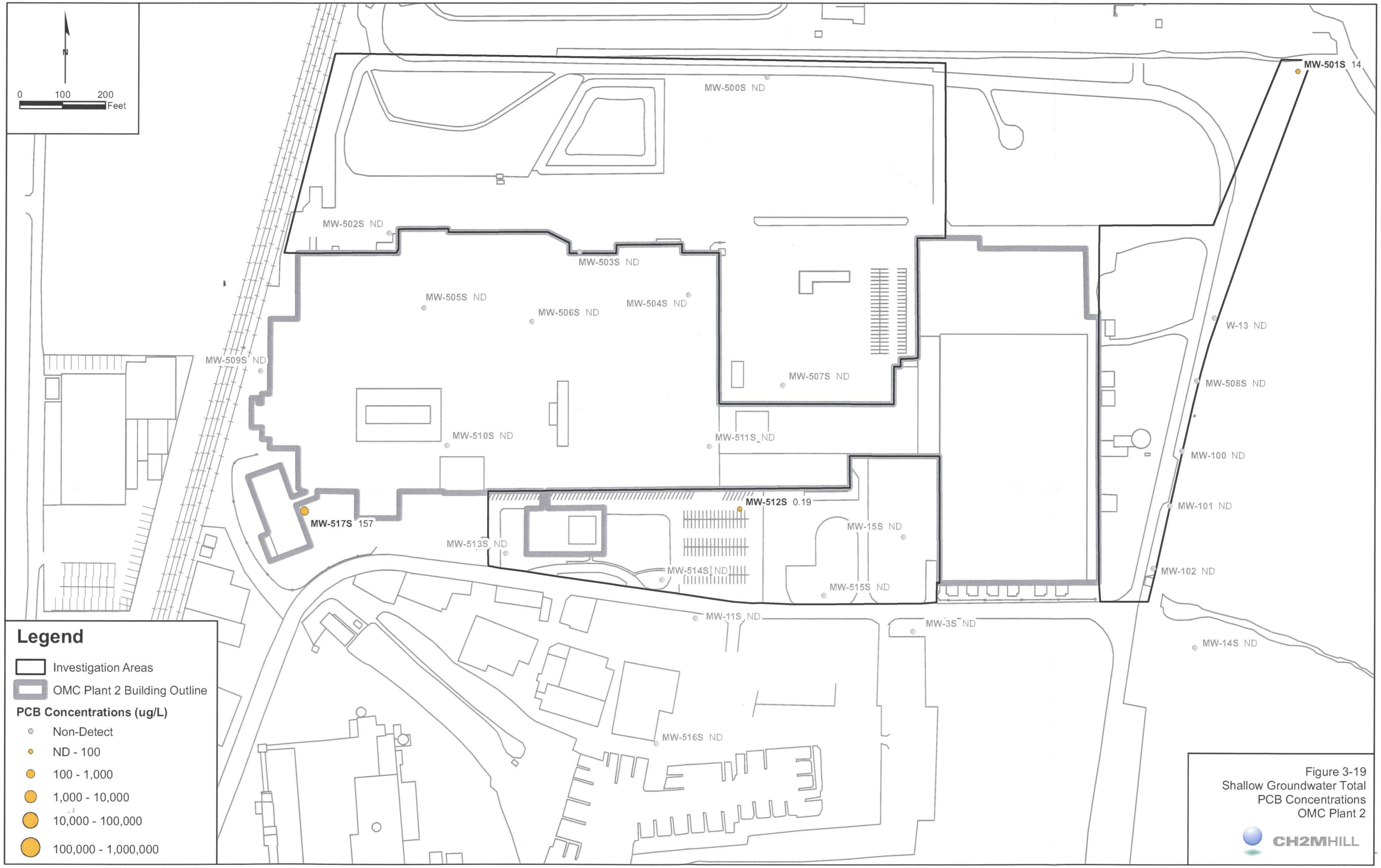
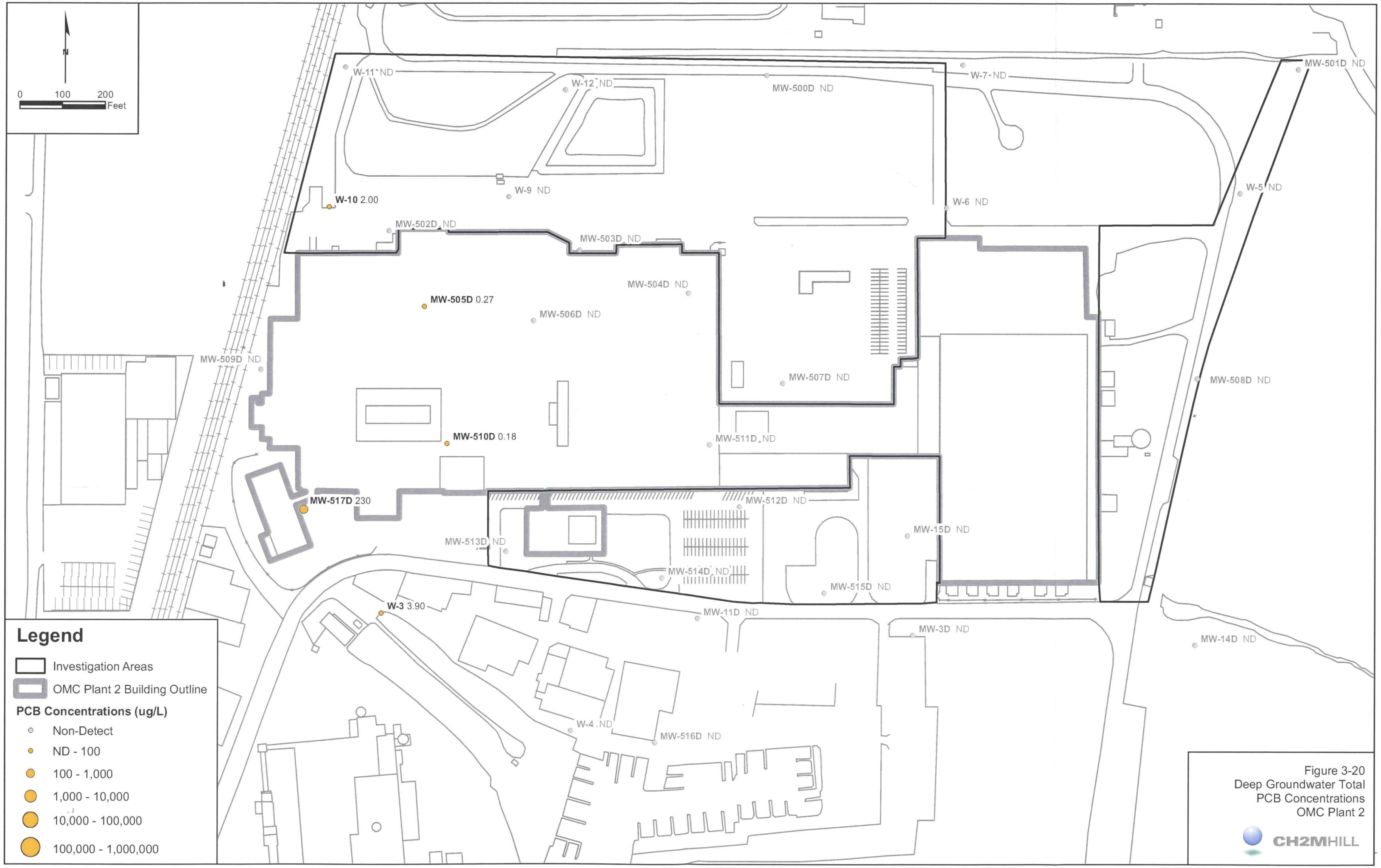


Figure 3-19
Shallow Groundwater Total
PCB Concentrations
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure3-19_GW_PCB_Shallow.mxd, Date: October 12, 2005 11:25:57 AM, User: JHANSEN1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0 100 200
Feet
W-11 ND
W-12 ND
MW-500D ND
W-7 ND
MW-501D ND
W-10 2.00
W-9 ND
W-6 ND
W-5 ND
MW-502D ND
MW-503D ND
MW-504D ND
MW-505D 0.27
MW-506D ND
MW-509D ND
MW-507D ND
MW-508D ND
MW-510D 0.18
MW-511D ND
MW-517D 230
MW-512D ND
MW-513D ND
MW-15D ND
MW-514D ND
MW-515D ND
W-3 3.90
MW-11D ND
MW-3D ND
MW-14D ND
W-4 ND
MW-516D ND
Legend
Investigation Areas
OMC Plant 2 Building Outline
PCB Concentrations (ug/L)
Non-Detect
ND - 100
100 - 1,000
1,000 - 10,000
10,000 - 100,000
100,000 - 1,000,000
Figure 3-20
Deep Groundwater Total
PCB Concentrations
OMC Plant 2
CH2MHILL

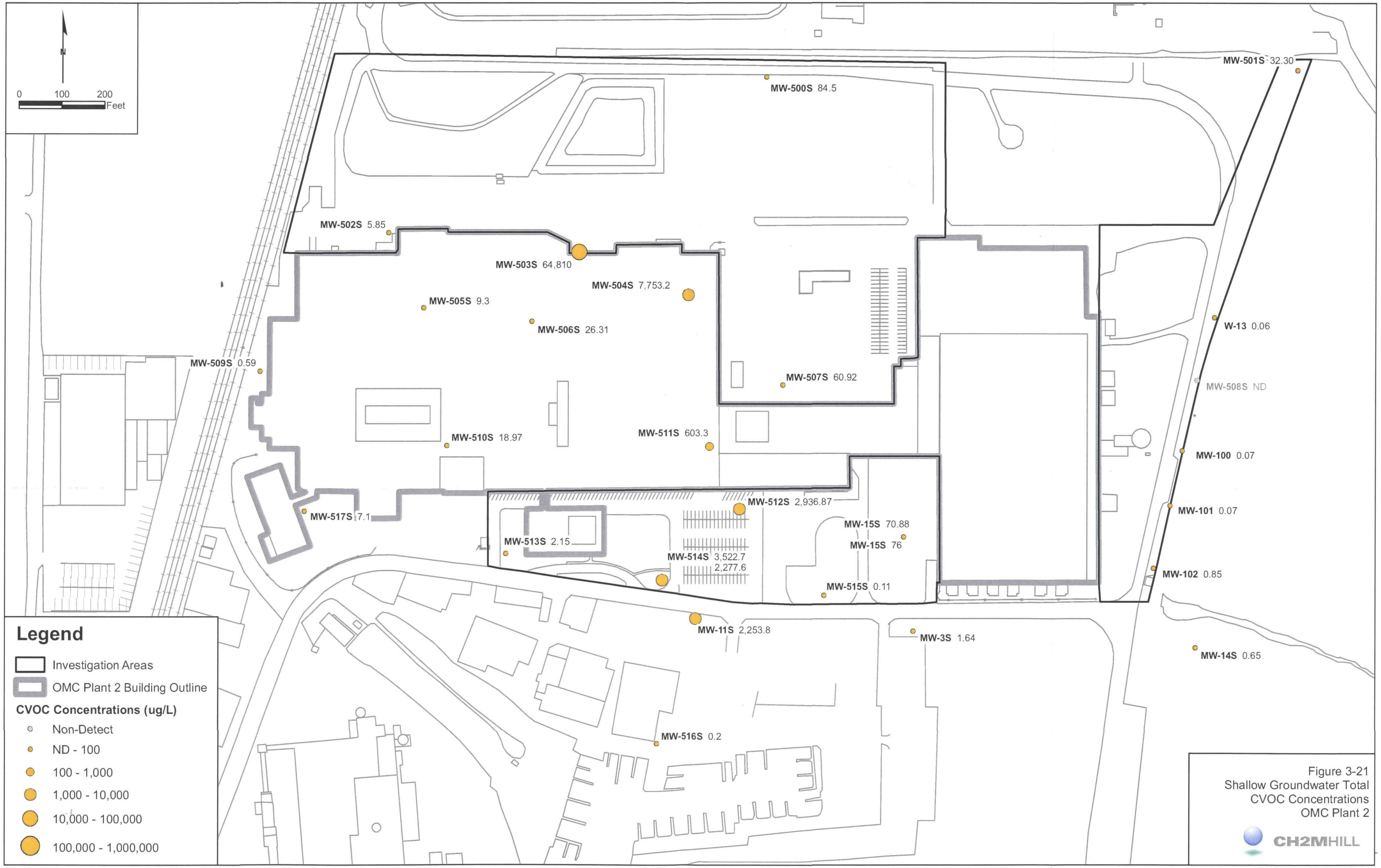

Figure 3-21
Shallow Groundwater Total
CVOC Concentrations
OMC Plant 2

CH2MHILL

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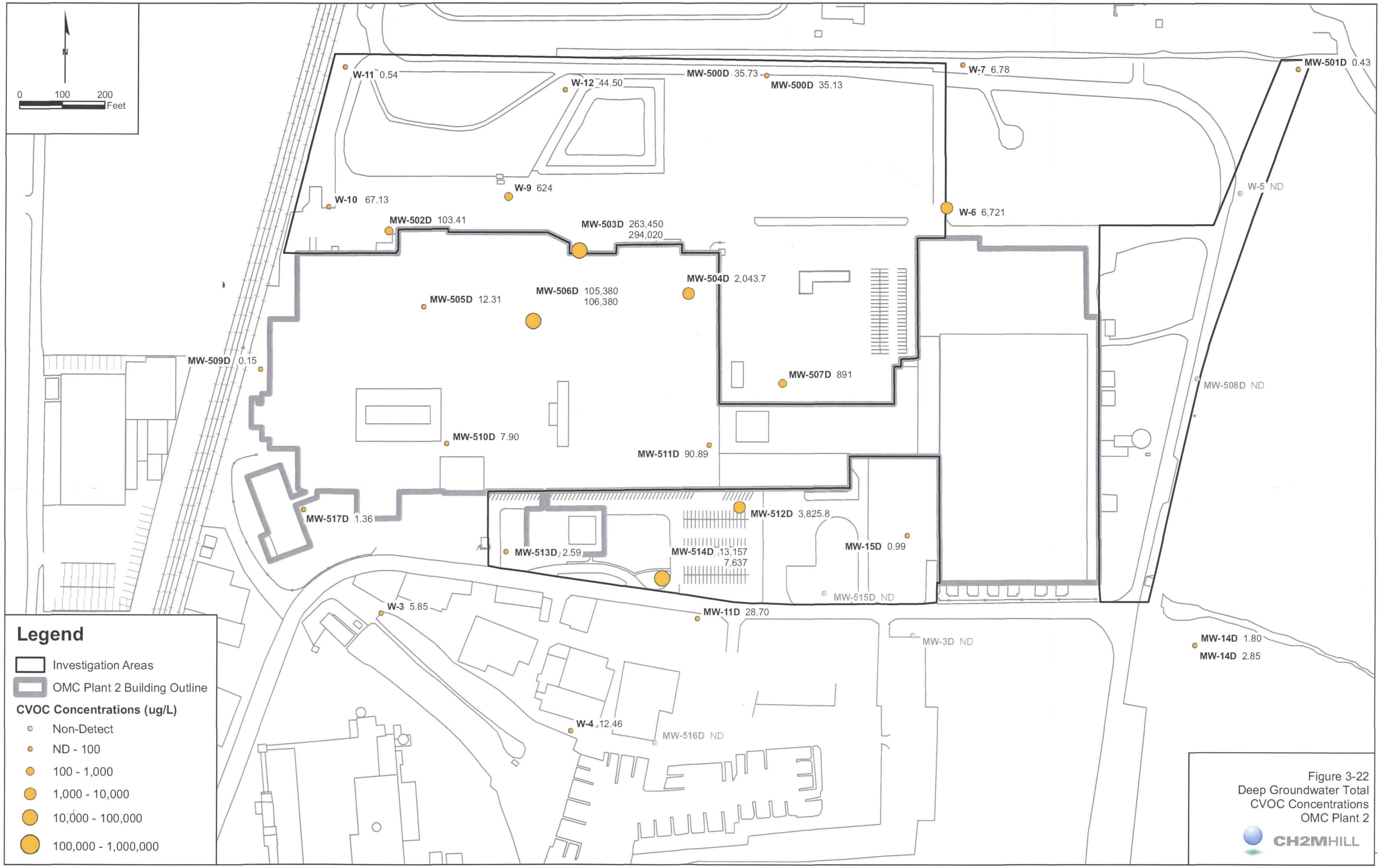

Figure 3-22
Deep Groundwater Total
CVOC Concentrations
OMC Plant 2

CH2MHILL

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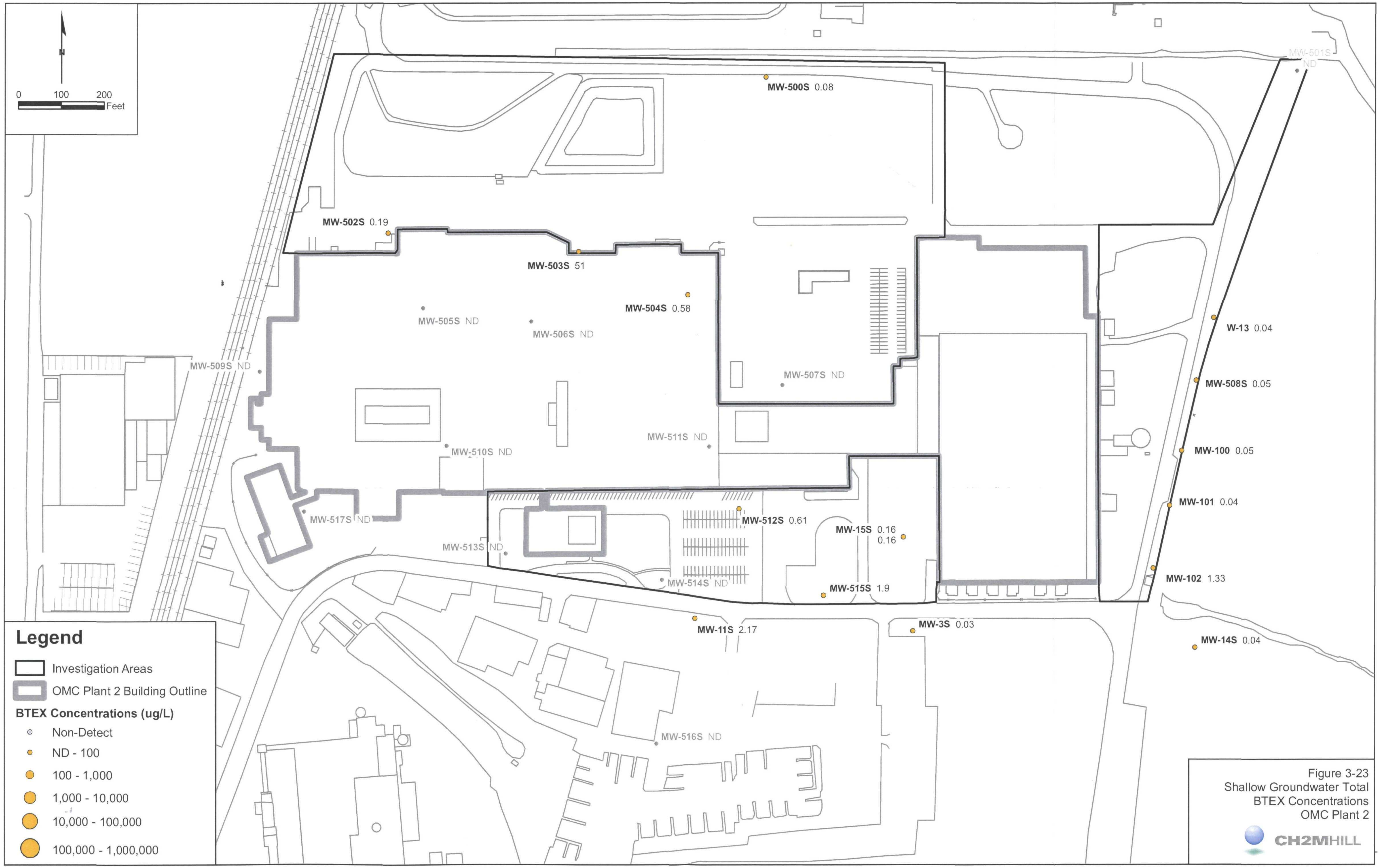

Figure 3-23
Shallow Groundwater Total
BTEX Concentrations
OMC Plant 2

CH2MHILL

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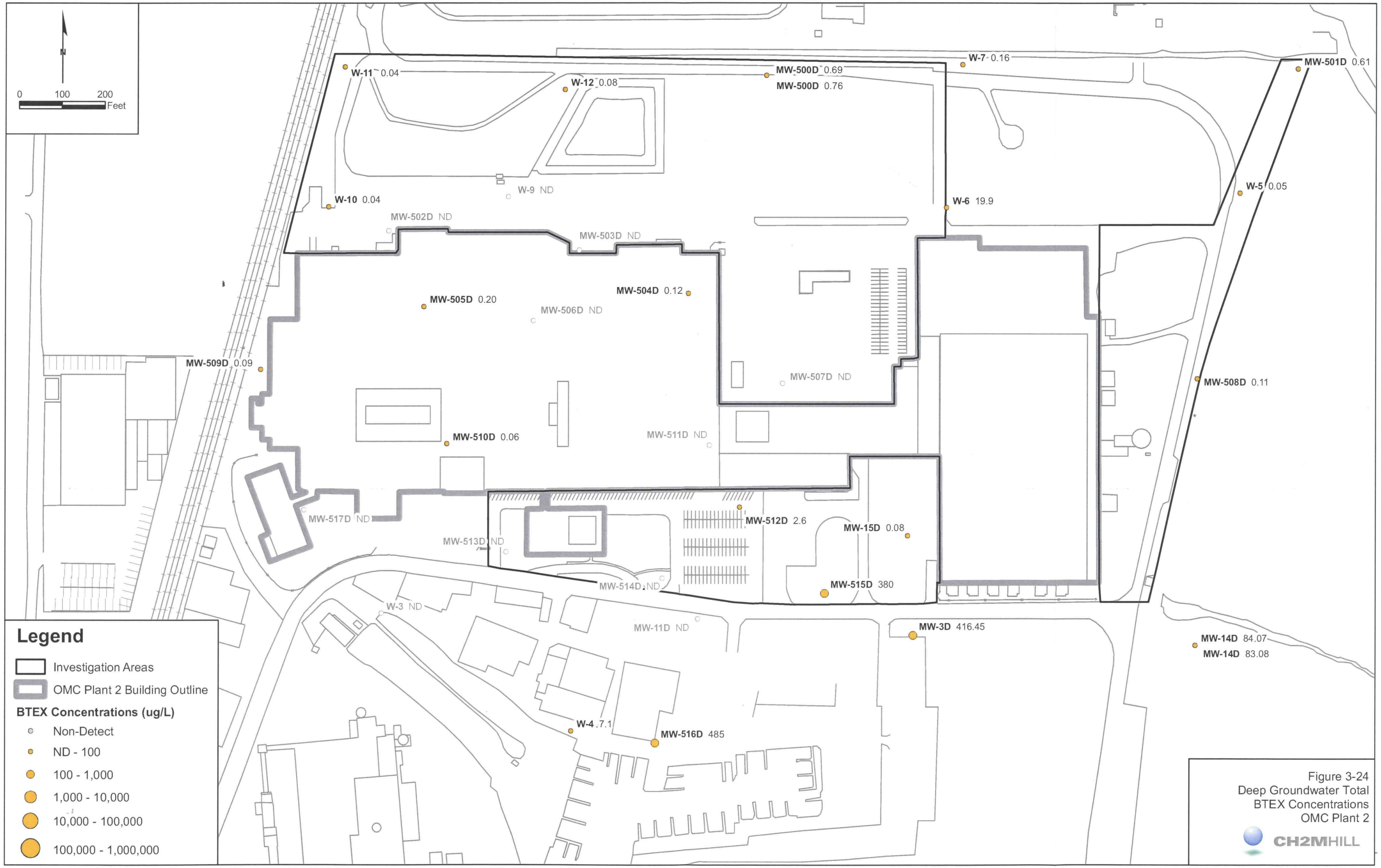

Figure 3-24
Deep Groundwater Total
BTEX Concentrations
OMC Plant 2

CH2MHILL

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Figure 3-25
Shallow Groundwater TCE Concentrations
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\October05\Figure03-25_Shallow_TCE_Contour.mxd, Date: 01 03, 2006, User: MPETERSH

Figure 3-26
Shallow Groundwater Cis-1,2-DCE Concentrations
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\October05\Figure03-26_Shallow_CIS12_DCE_Contour.mxd, Date: 01 03, 2006, User: MPETERSH

Figure 3-27
Shallow Groundwater Vinyl Chloride Concentrations
OMC Plant 2

CH2MHILL

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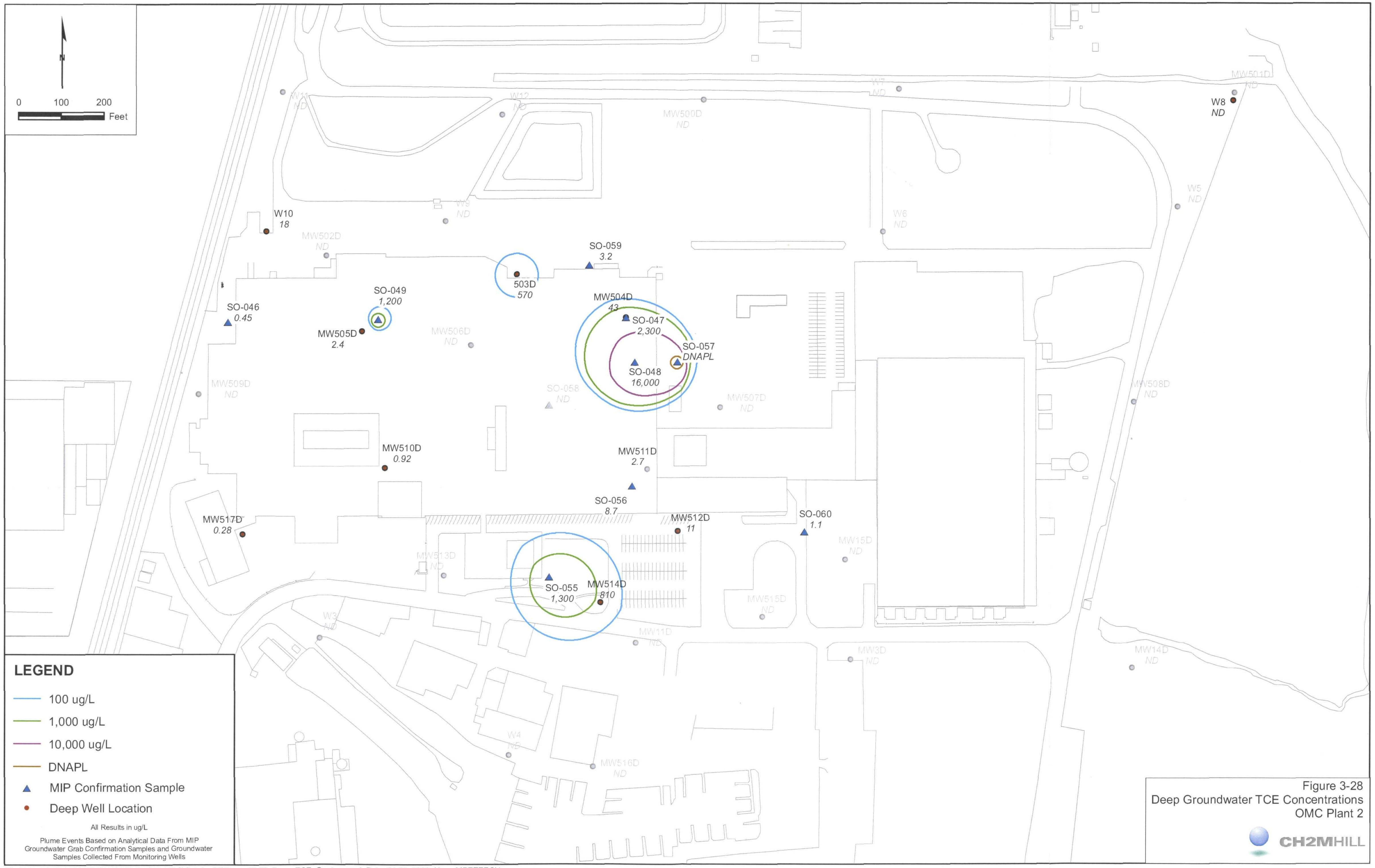

Figure 3-28
Deep Groundwater TCE Concentrations
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\October05\Figure03-28_Deep_TCE_Contour.mxd, Date: 01 03, 2006, User: MPETERSH

Figure 3-29
Deep Groundwater Cis-1,2-DCE Concentrations
OMC Plant 2

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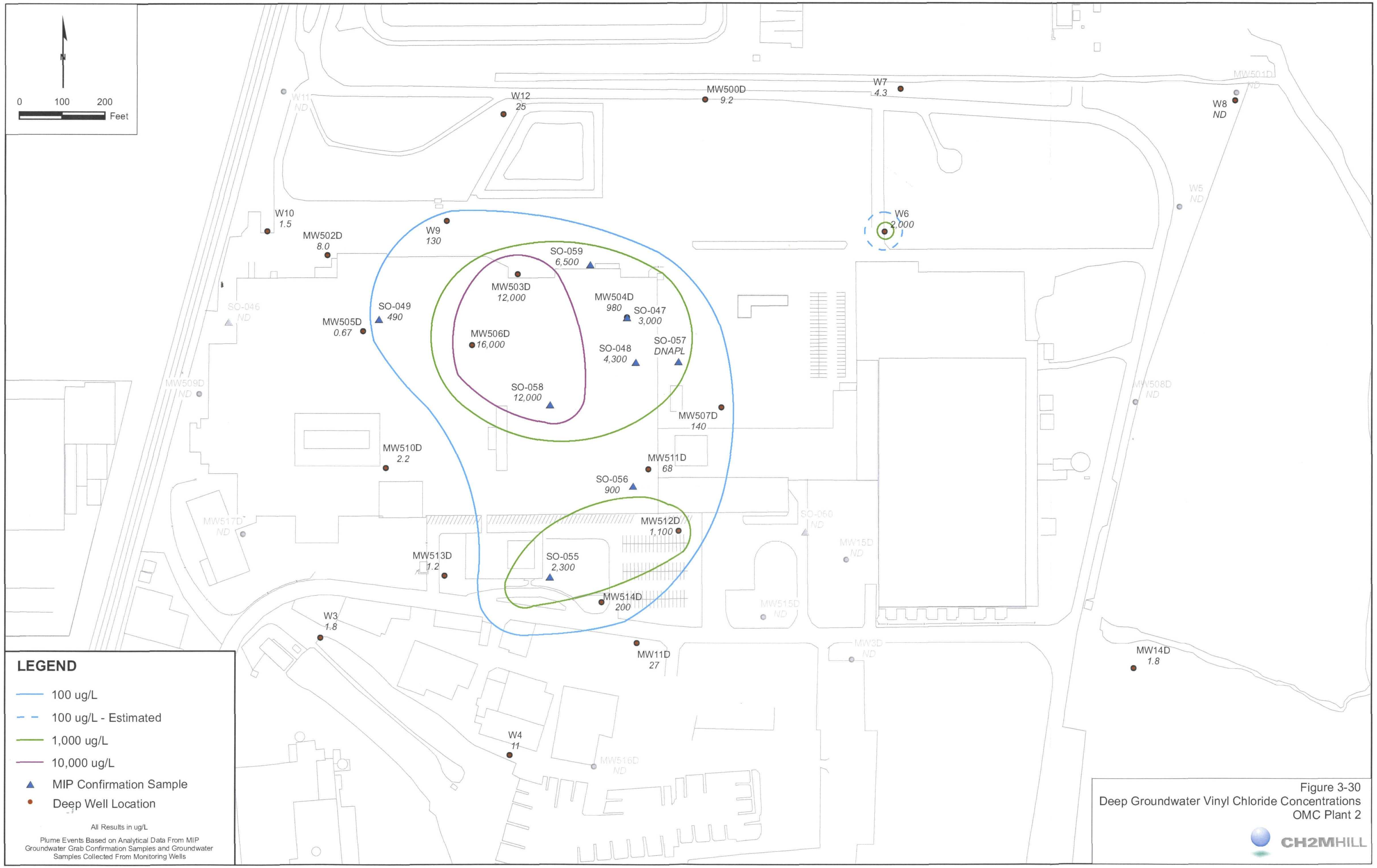

Figure 3-30
Deep Groundwater Vinyl Chloride Concentrations
OMC Plant 2

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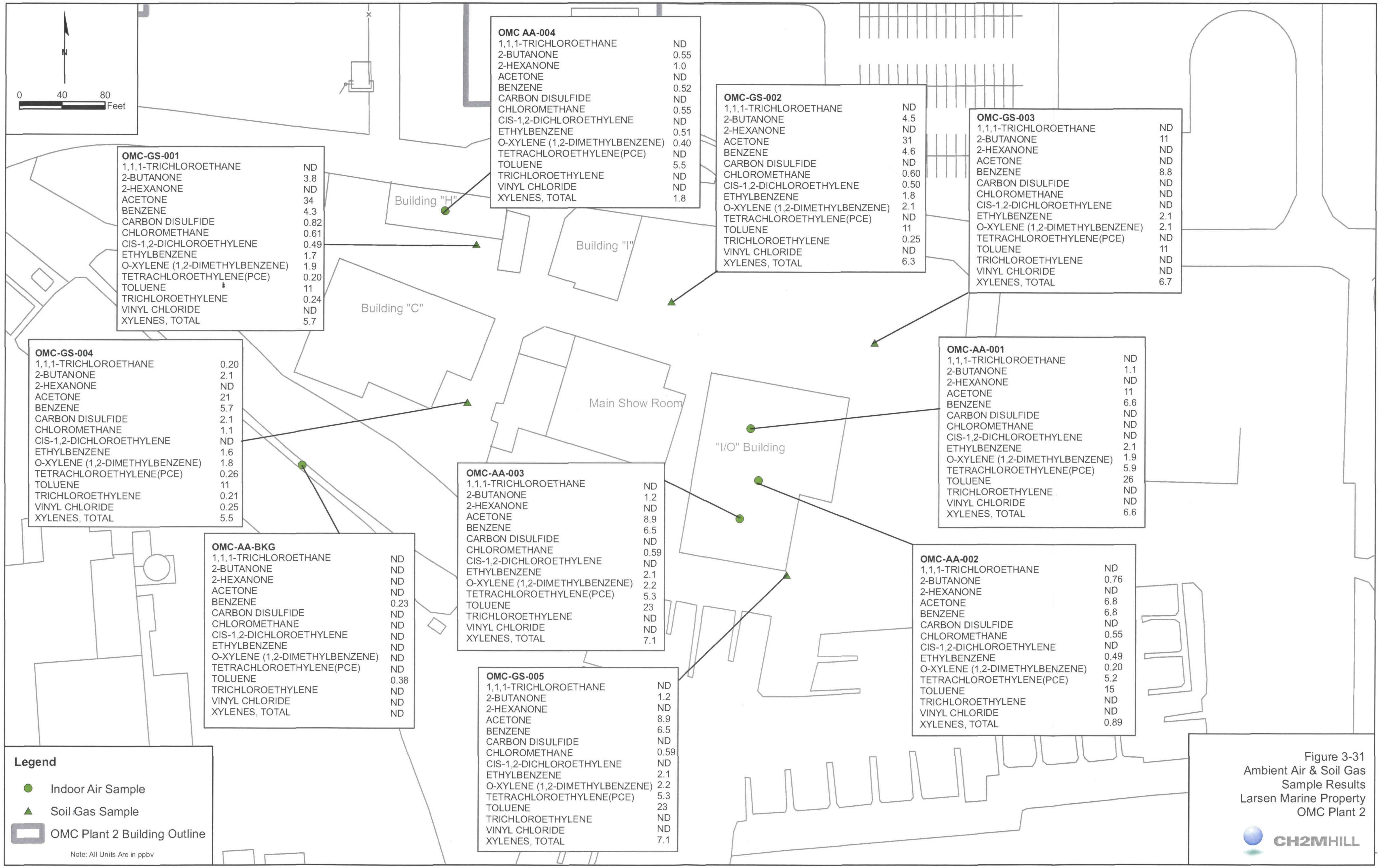


OMC-GS-001	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	3.8
2-HEXANONE	ND
ACETONE	34
BENZENE	4.3
CARBON DISULFIDE	0.82
CHLOROMETHANE	0.61
CIS-1,2-DICHLOROETHYLENE	0.49
ETHYLBENZENE	1.7
O-XYLENE (1,2-DIMETHYLBENZENE)	1.9
TETRACHLOROETHYLENE(PCE)	0.20
TOLUENE	11
TRICHLOROETHYLENE	0.24
VINYL CHLORIDE	ND
XYLENES, TOTAL	5.7

OMC AA-004	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	0.55
2-HEXANONE	1.0
ACETONE	ND
BENZENE	0.52
CARBON DISULFIDE	ND
CHLOROMETHANE	0.55
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	0.51
O-XYLENE (1,2-DIMETHYLBENZENE)	0.40
TETRACHLOROETHYLENE(PCE)	ND
TOLUENE	5.5
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	1.8

OMC-GS-002	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	4.5
2-HEXANONE	ND
ACETONE	31
BENZENE	4.6
CARBON DISULFIDE	ND
CHLOROMETHANE	0.60
CIS-1,2-DICHLOROETHYLENE	0.50
ETHYLBENZENE	1.8
O-XYLENE (1,2-DIMETHYLBENZENE)	2.1
TETRACHLOROETHYLENE(PCE)	ND
TOLUENE	11
TRICHLOROETHYLENE	0.25
VINYL CHLORIDE	ND
XYLENES, TOTAL	6.3

OMC-GS-003	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	11
2-HEXANONE	ND
ACETONE	ND
BENZENE	8.8
CARBON DISULFIDE	ND
CHLOROMETHANE	ND
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	2.1
O-XYLENE (1,2-DIMETHYLBENZENE)	2.1
TETRACHLOROETHYLENE(PCE)	ND
TOLUENE	11
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	6.7

OMC-GS-004	
1,1,1-TRICHLOROETHANE	0.20
2-BUTANONE	2.1
2-HEXANONE	ND
ACETONE	21
BENZENE	5.7
CARBON DISULFIDE	2.1
CHLOROMETHANE	1.1
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	1.6
O-XYLENE (1,2-DIMETHYLBENZENE)	1.8
TETRACHLOROETHYLENE(PCE)	0.26
TOLUENE	11
TRICHLOROETHYLENE	0.21
VINYL CHLORIDE	0.25
XYLENES, TOTAL	5.5

OMC-AA-001	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	1.1
2-HEXANONE	ND
ACETONE	11
BENZENE	6.6
CARBON DISULFIDE	ND
CHLOROMETHANE	ND
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	2.1
O-XYLENE (1,2-DIMETHYLBENZENE)	1.9
TETRACHLOROETHYLENE(PCE)	5.9
TOLUENE	26
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	6.6

OMC-AA-003	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	1.2
2-HEXANONE	ND
ACETONE	8.9
BENZENE	6.5
CARBON DISULFIDE	ND
CHLOROMETHANE	0.59
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	2.1
O-XYLENE (1,2-DIMETHYLBENZENE)	2.2
TETRACHLOROETHYLENE(PCE)	5.3
TOLUENE	23
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	7.1

OMC-AA-BKG	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	ND
2-HEXANONE	ND
ACETONE	ND
BENZENE	0.23
CARBON DISULFIDE	ND
CHLOROMETHANE	ND
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	ND
O-XYLENE (1,2-DIMETHYLBENZENE)	ND
TETRACHLOROETHYLENE(PCE)	ND
TOLUENE	0.38
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	ND

OMC-GS-005	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	1.2
2-HEXANONE	ND
ACETONE	8.9
BENZENE	6.5
CARBON DISULFIDE	ND
CHLOROMETHANE	0.59
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	2.1
O-XYLENE (1,2-DIMETHYLBENZENE)	2.2
TETRACHLOROETHYLENE(PCE)	5.3
TOLUENE	23
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	7.1

OMC-AA-002	
1,1,1-TRICHLOROETHANE	ND
2-BUTANONE	0.76
2-HEXANONE	ND
ACETONE	6.8
BENZENE	6.8
CARBON DISULFIDE	ND
CHLOROMETHANE	0.55
CIS-1,2-DICHLOROETHYLENE	ND
ETHYLBENZENE	0.49
O-XYLENE (1,2-DIMETHYLBENZENE)	0.20
TETRACHLOROETHYLENE(PCE)	5.2
TOLUENE	15
TRICHLOROETHYLENE	ND
VINYL CHLORIDE	ND
XYLENES, TOTAL	0.89

Figure 3-31
Ambient Air & Soil Gas
Sample Results
Larsen Marine Property
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\October05\Figure3-31_Ambient_Marine_Soil_Gas_locs.mxd, Date: December 28, 2005 1:33:55 PM, User: JHANSEN1

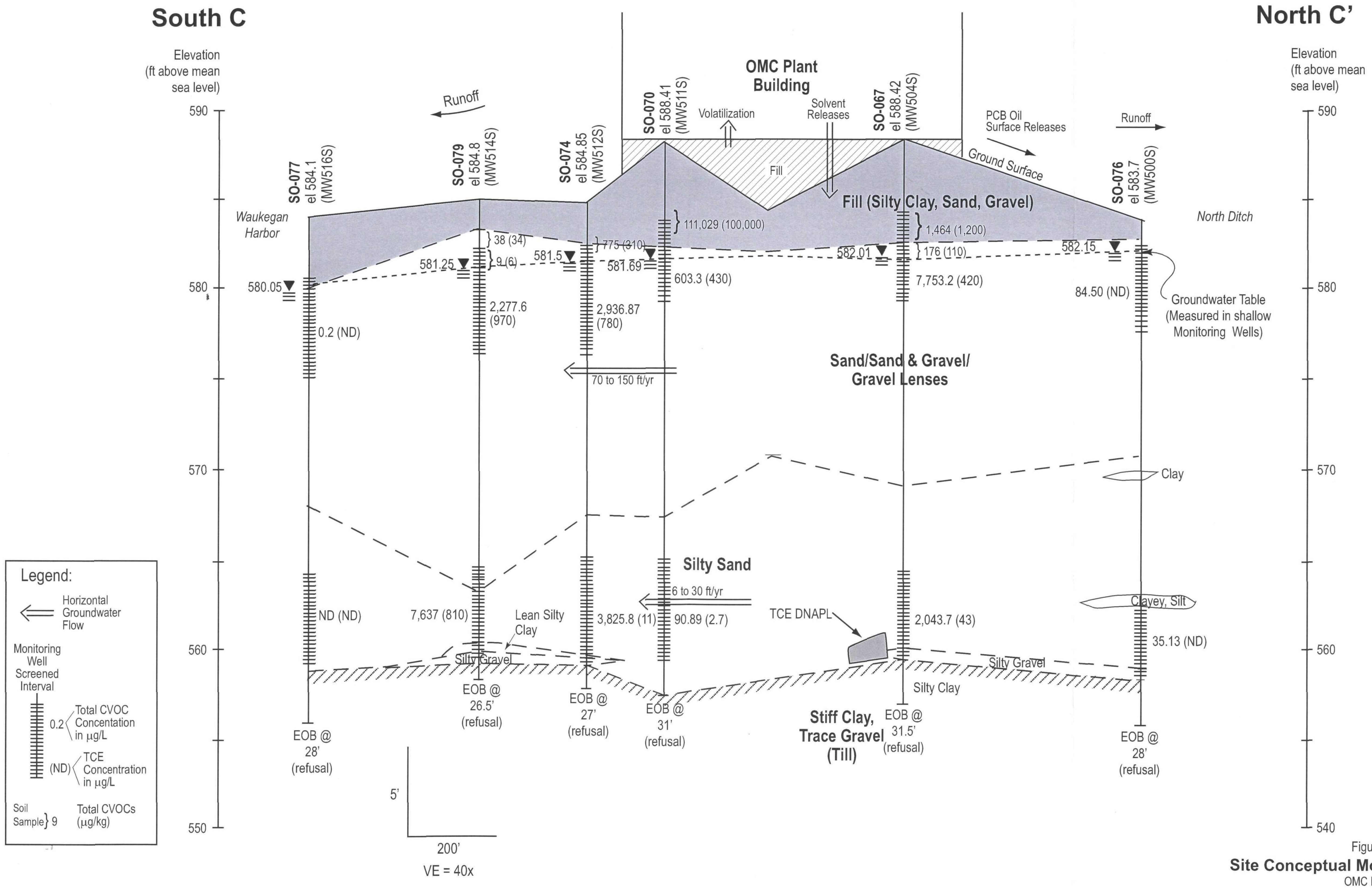


Figure 4-1
Site Conceptual Model
OMC Plant 2
CH2MHILL

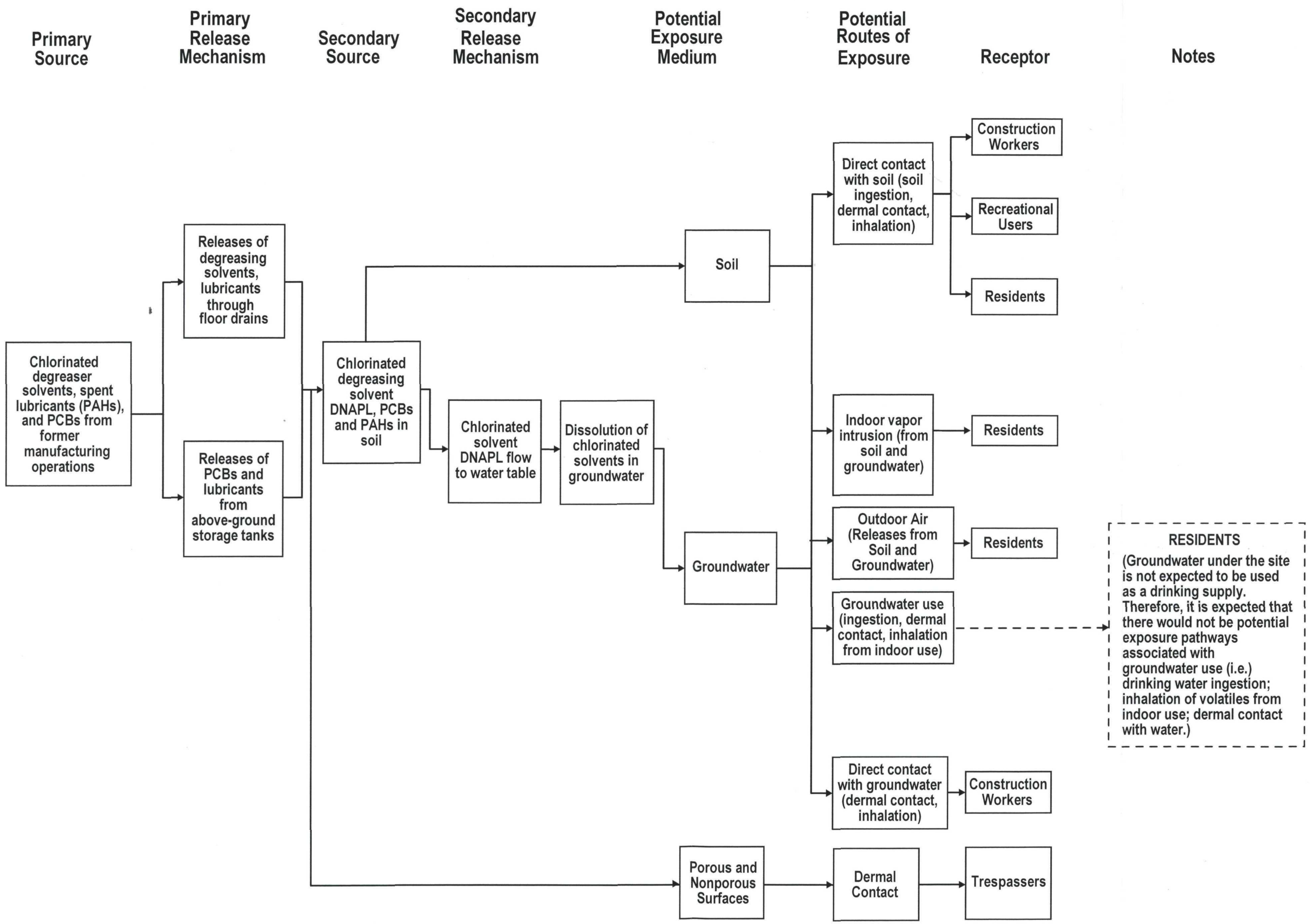


Figure 5-1
Conceptual Model of Potential Exposure Pathways
OMC Plant 2

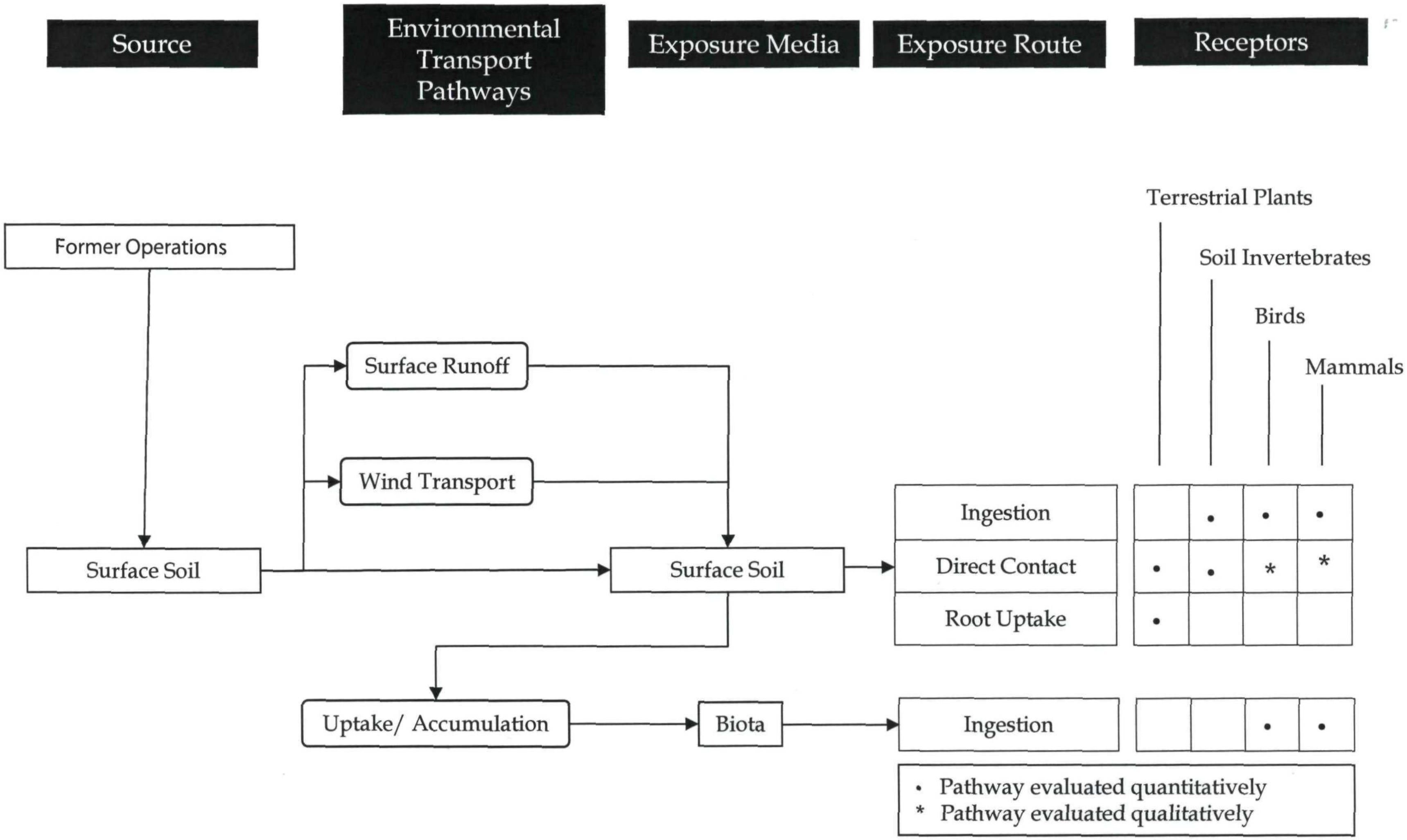
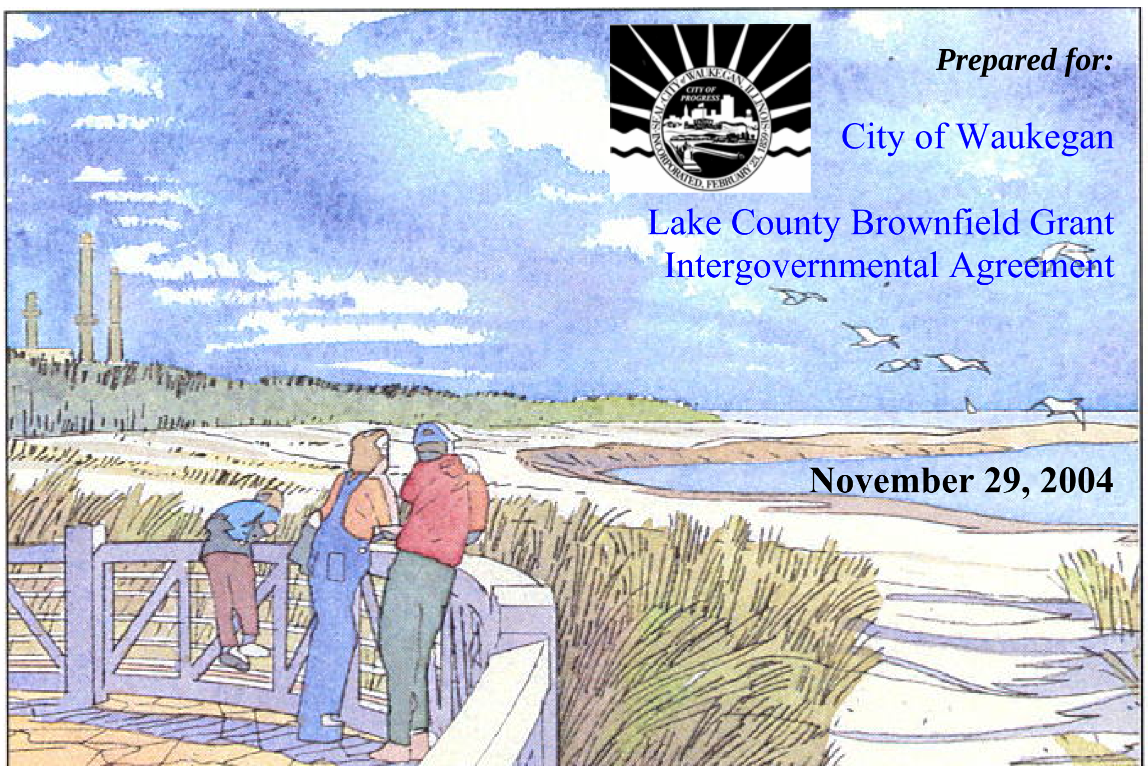


FIGURE 6-1
Preliminary Ecological Conceptual Model
OMC Plant 2
Waukegan, Illinois

Appendix A
Lake Michigan Lakefront Study Area Reports

Environmental Site Investigation Report

Former OMC Waukegan Property
Lake Michigan Lakefront Study Area



Prepared for:

City of Waukegan

Lake County Brownfield Grant
Intergovernmental Agreement

November 29, 2004

Graphic from A 21st Century Vision for Waukegan's Downtown and Lakefront, SOM, July 2003

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1.0 Background & Objectives

1.1 Prior Land Uses

The Outboard Marine Corporation (OMC) North Plant (Plant No. 2) was constructed in several phases between 1949 and 1975. The western portion of the plant was purchased by OMC from EJ&E Railroad Co. in 1948. The easternmost 47 acres of the Plant 2 property was purchased by OMC from Abbott Laboratories in 1956. A landfill area was operated by Abbott on the adjoining northwest properties that are now developed by the North Shore Sanitary District. In December 2000, OMC permanently closed its Waukegan lakefront manufacturing plants, declared bankruptcy and has not sought re-organization. Local, State and Federal government are working cooperatively to address the environmental impact left by OMC. Several areas of the North Plant property have been designated by the United States Environmental Protection Agency (USEPA) as Superfund operable units and are being investigated and/or remediated under the USEPA Superfund program. The easternmost portion of the OMC North Plant appears to have been largely undisturbed property which abuts the Lake Michigan shoreline. This approximate 13 acre land area on the easternmost side of the OMC North Plant is the subject of this report.

1.2 Objectives of Environmental Investigation

The City of Waukegan is working cooperatively with USEPA and Illinois EPA to address the abandonment of all former OMC properties on the Waukegan lakefront. The City currently has an option to acquire various parcels of the OMC North Plant and is working with the State and Federal governments to sign a Consent Decree that will allow the City to take ownership of the property and to perform certain operation & maintenance (O&M) activities at the property.

The objective of this environmental investigation was to obtain information needed to re-open public access to the Lake Michigan waterfront area of the OMC North Plant property and to establish a habitat conservation zone within the waterfront area. A possible future goal would be to have the fenced access gates on the north side of Sea Horse Drive re-located and public access established (after it can be demonstrated that the area poses no unacceptable human health and/or environmental risks). Controlled recreational use of the waterfront portion of the OMC North Plant area between the existing City Municipal Beach and the North Shore Sanitary District property may also be considered. Access to the OMC North Plant's abandoned former manufacturing, process and waste containment areas will remain restricted until such time that environmental conditions allow for safe public access, redevelopment and re-use.

An environmental site investigation was conducted to assess environmental conditions on the lakefront portion of the former OMC North Plant Property. This investigation focused on collection of data that is needed to determine if existing conditions pose a threat to human health and the environment.

The site investigation was performed for the following objectives:

- Identify and delineate potentially sensitive habitats in the study area and protect such habitats during the site investigation work.
- Test soil, sediment, and shallow groundwater in the study area for the presence of chemical constituents.
- Evaluate the levels of chemical constituents measured in soil, sediment, and groundwater samples by comparing such levels to human health risk-based standards and screening levels.
- Coordinate the findings of this focused site investigation with other related investigations and make recommendations as to future tasks leading to re-use and conservation of the lakefront study area.

1.3 Current Site Setting & Conditions

Figure 1 depicts the study area, which includes approximately 1,200 feet (ft) of waterfront. The study area is generally inaccessible from Sea Horse Drive North to the North Shore Sanitary District's southern property boundary. This lakefront property study area is approximately 13 acres.

Historically, the study area was never developed with surface structures or infrastructure. During past periods, Lake Michigan lake water levels had inundated a portion of the study area and some shoreline protection boulders are present along the west side of the study area indicating past lake water levels. Since this time, Lake Michigan water levels have retreated revealing additional beach area. Vegetation has been re-established in some areas of the lakefront parcel where wind and wave action do not impact the emergence of plant life.

Soils consist of very fine to fine native sands underlain by a silty clay till unit that extends to a depth of 110 ft. Depth to groundwater is 2 to 5 ft. below ground surface (bgs) and is highly influenced by Lake Michigan water levels. Soils encountered during the site investigation were consistently brown to gray fine sand, well sorted, loose to medium dense. Saturated sands were observed around elevations of 94.9 to 95.7 feet (site reference elevations, not USGS), based on survey stake marker information. Based on static water level measurements taken from temporary monitoring wells installed during the site investigation, the localized groundwater flow appears to be northerly.

The North Shore Sanitary District's (NSSD) secondary outfall adjoins the study area to the north and joins up with the North Ditch of the OMC Plant. Wind and wave action have shifted the NSSD outfall flow and carved a surface swale across the northeastern portion of the study area. A stormwater ditch and large swale that is beginning to develop into a wetland area also borders the southern portion of the study area east of Sea Horse Drive.

2.0 Scope of Investigation

In determining environmental conditions in the study area, a site investigation was conducted in the study area of the property as outlined herein.

2.1 Basis of Investigation

The environmental conditions on the adjoining OMC North Plant, the former Abbott landfill, the Waukegan Manufactured Gas (WMG) and Coke Plant site and the Johns-Manville site have the potential to have impacted the study area and provide a basis for this site investigation. Prior releases of hazardous substances from the OMC North Plant are documented in various references. Polychlorinated biphenyls (PCBs), heavy metals, volatile organic compounds, and various petroleum and chlorinated hydrocarbons are contaminants of concern at the OMC property. A groundwater plume emanating from the former trichloroethene (TCE) degreasing unit has been found to extend to wells immediately west of the study area.

Asbestos-containing debris has been found on certain lakefront sites, including Illinois Beach State Park, the Midwest Generation fishing pier area and properties in the vicinity of the Johns-Manville Superfund site located north of the subject property.

A groundwater plume emanating from the former WMG & Coke Plant site has documented groundwater impact at monitoring wells in the Municipal beach area immediately south of the study area. Groundwater constituents of concern from the former WMG & Coke Plant site include arsenic, nitrates, sulfates, ammonia, cyanide, phenols, and thiocyanate.

2.2 Reconnaissance for Habitat Identification, Delineation & Protection

As a first step in the site investigation, a land surveyor staked a 100 ft. rectangular grid system across the Study Area. A terrestrial ecologist then conducted a site walk over during the week of 23 July 2004. A systematic reconnaissance survey was used by the ecologist to identify and map potential sensitive habitats, wetlands, and biota. Field flagging was utilized to delineate such areas. The flagging were also used as visual barriers for the subsequent Geoprobe rig and sampling personnel, thereby serving as conservation and protective habitat measures during the site investigation.

In summary, the ecologist's meander survey of the existing flora and plant communities of the OMC site (north of the Waukegan Beach area) resulted in two state endangered plant species being found and three areas of wetland communities being identified.

The study area is characterized as being a dry sand prairie/foredune community dominated by marram grass (*Amophila beviligulata*), little bluestem grass (*Schizachyrium* *scoparium*) and sand reed (*Calamovilfa longifolia*). Forb diversity is quite low with most of the species, often represented by only one or two individuals, occurring along a narrow strip on the west edge of the property. Forb diversity includes such species as butterfly weed (*Asclepias tuberosa*), horse mint (*Monadra punctata villicaulis*), beach wormwood (*Artemisia caudata*), rough blazing star (*Liatris aspera*) and old field goldenrod (*Solidago nemoralis*).

Some depressional areas within the sand prairie/ foredune community contain fairly large populations of lake shore rush (*Juncus balticus littoralis*), suggesting that these areas are nearer to the water table. However, lack of significant wetland associates in these areas did not warrant flagging these sites as wetlands to be avoided.

The two state endangered species found on the site are in this prairie community. The two species include:

- Marram grass (*Amophila breviligulata)*, the dominant grass cover, and
- Kalm's St. John's wort (*Hypericum kalmianum*).

The *Amophila*, which serves the important function of stabilizing the sand dunes, dominates the site and is found evenly dispersed in a near continuous cover across the entire area and was therefore not flagged. The *Hypericum* population is represented by 6-8 plants located in the southwest corner of the property. This population was flagged with orange pin flags to avoid disturbance.

Three wetland areas are represented by drainage ditches on the north and south edges of the property and by a small depression along the north ditch near the lakeshore. The small depression was flagged with orange pin flags to avoid disturbance. A narrow terrace along the north side of the south drainage ditch contained significant amounts of conservative wetland species (i.e., a species when observed in an area gives a high degree of confidence that the plant is from a remnant natural area) including;

- Ohio goldenrod (*Solidago ohiensis*),
- Richardson's rush (*Juncus alpinus rariflorus*),
- Prairie wedge grass (*Sphenopholis obtusata*), and
- Green twayblade orchids (*Liparis loeselii*).

The small population of green twayblade orchids was found along the north side of the south drainage ditch in the southwest corner of the property. This population was marked with orange flagging ribbon to avoid disturbance.

2.3 Site Investigation Approach

Figure 2 presents an overview of the site investigation for the study area. Tables 1 through 3 list the analytical protocol for each of the sampled matrices (i.e., soil, sediment and groundwater). Sample locations were established using field survey techniques.

2.3.1 Subsurface Soils

A grid pattern (See Figure 2) of surface and subsurface borings for soil was established. The first phase for the site investigation utilized a grid sampling interval of 200 feet. Since PCB contamination was found at concentrations above the IEPA soil remediation objectives, a second phase was conducted, which tightened the grid to focus on extent of PCB impact. In areas of poor accessibility, soil boring locations were offset slightly from the survey stakes. Field survey measurements were taken to record the boring offsets.

The first phase sampling of the site investigation was conducted between 28 and 30 July 2004. A second phase of sampling was conducted between 8 and 11 October 2004. Borings were advanced using a Geoprobe direct push sampling technique. To minimize disturbance of the surface soils and natural habitat, a small track mounted Geoprobe rig with low ground pressure pads was utilized. The macro core and related sampling equipment were decontaminated between each sample drive with distilled water and non-phosphate cleaning agent.

Composite soil samples were collected from the 0 to 3-foot and 5 to 8-foot soil intervals. The lower interval represented the interface of the groundwater/vadose zone. The composite soil samples collected during the first sampling event were analyzed for semi-volatile organic compounds (SVOCs), metals, polychlorinated biphenyls (PCBs) and pH. Discrete soil samples were collected at 2 and 6 feet bgs using USEPA Method 5035 Purge and Trap VOC sampling techniques. The discrete samples were analyzed for volatile organic compounds (VOCs). The composite samples collected during Phase 2 were only analyzed for PCBs.

During the soil sampling, a MinnieRae2000 photoionization detector (PID) was used to field screen for potential VOCs. Soils were classified by a field geologist, and logs were prepared to document the subsurface soil conditions (see Attachment B). Upon completion of each soil boring, bentonite chips were placed into the borehole up to surrounding grade. If any soil boring was offset from the original survey stake, measurements were recorded on the logs to document the modified locations.

Table 1 summarizes the sample grid locations and lists the analytical protocol for soil samples collected during both phases of the Site Investigation.

Table 1—Soil Sampling and Analysis Plan

Soil Probe Sample	Sample Depth (ft bgs)	Grid Location	Lab Parameters
S-01	0-3 and 5-8	E000, N200	PCBs, Metals, SVOCs, VOCs, pH
S-02	0-3 and 5-8	E200, N200	PCBs, Metals, SVOCs, VOCs, pH
S-03	0-3	E400, N200	PCBs, Metals, SVOCs, VOCs, pH
S-04	0-3 and 5-8	E000, N400	PCBs, Metals, SVOCs, VOCs, pH
S-05	0-3 and 5-8	E200, N400	PCBs, Metals, SVOCs, VOCs, pH
S-06	0-3	E400, N400	PCBs, Metals, SVOCs, VOCs, pH

Table 1—Soil Sampling and Analysis Plan (Continued)

Soil Probe Sample	Depth (ft bgs)	Grid Location	Lab Parameters
S-07	0-3 and 5-8	E000, N600	PCBs, Metals, SVOCs, VOCs, pH
S-08	0-3 and 5-8	E200, N600	PCBs, Metals, SVOCs, VOCs, pH
S-09	0-3	E400, N600	PCBs, Metals, SVOCs, VOCs, pH
S-10	0-3 and 5-8	E000, N800	PCBs, Metals, SVOCs, VOCs, pH
S-11	0-3 and 5-8	E200, N800	PCBs, Metals, SVOCs, VOCs, pH
S-12	0-3	E400, N800	PCBs, Metals, SVOCs, VOCs, pH
S-13	0-3 and 5-8	E000, N1000	PCBs, Metals, SVOCs, VOCs, pH
S-14	0-3 and 5-8	E200, N1000	PCBs, Metals, SVOCs, VOCs, pH
S-15	0-3 and 5-8	E200, N700	PCBs
S-16	0-3 and 5-8	E200, N900	PCBs
S-17	0-3 and 5-8	E300, N800	PCBs
S-18	0-3 and 5-8	E100, N900	PCBs
S-19	0-3 and 5-8	E100, N800	PCBs
S-20	0-3 and 5-8	E100, N700	PCBs
S-21	0-3 and 5-8	E100, N600	PCBs
S-22	0-3 and 5-8	E100, N500	PCBs
S-23	0-3 and 5-8	E100, N1000	PCBs
S-24	0-3 and 5-8	E100, N1100	PCBs
S-25	0-3 and 5-8	E000, N1100	PCBs
S-26	0-3 and 5-8	E000, N900	PCBs
S-27	0-3 and 5-8	E000, N700	PCBs
S-28	0-3 and 5-8	E000, N500	PCBs

2.3.2 Sediments

During the first round of sampling, sediment samples were collected as part of the site investigation at approximate 200-feet station intervals (Figure 2) along a north and south drainage ditch. This sediment sampling was conducted on 29 July 2004. Phase 2 sediment sampling was conducted on 11 October 2004, with samples located between Phase 1 sample locations, resulting in an approximate 100-foot station interval throughout both ditches. A total of nine sediment samples were collected along the north ditch and five sediment samples were collected along the south ditch. Stainless steel sampling tools were used to obtain sediments from the sediment surface to approximately 6-inches. The sampling tools were decontaminated with distilled water and non-phosphate cleaning agent between each sampling station. The sediment samples analyzed for SVOCs, metals, PCBs and pH. Two sediment samples were also analyzed for total organic carbon content (TOC). Table 2 summarizes the sediment sample locations and analytical protocol used in the Site Investigation.

Table 2--Sediment Sampling & Analysis Plan

Sediment Sample	**Location/Station Interval**	**Lab Parameters**
North Ditch		
N-sed-01	Confluence of OMC N. Ditch and NSSD Outfall	PCBs, Metals, SVOCs, pH, Total Organic Carbon
N-sed-02	+200 ft. Southeast	PCBs, Metals, SVOCs
N-sed-03	+200 ft. Southeast	PCBs, Metals, SVOCs
N-sed-04	+200 ft. Southeast	PCBs, Metals, SVOCs
N-sed-05	+200 ft. Southeast	PCBs, Metals, SVOCs
N-sed-06	+100 ft. West of N-sed-01	PCBs, arsenic, SVOCs
N-sed-07	+100 ft. Southeast of N-sed-01	PCBs, arsenic, SVOCs
N-sed-08	+100 ft. Southeast of N-sed-03	PCBs, arsenic, SVOCs
N-sed-09	+100 ft. Southeast of N-sed-04	PCBs, arsenic, SVOCs
South Ditch		
S-sed-01	Outfall East of Sea Horse Dr.	PCBs, Metals, SVOCs, pH, TOC
S-sed-02	+ 200 ft. East	PCBs, Metals, SVOCs
S-sed-03	+200 ft. East	PCBs, Metals, SVOCs
S-sed-04	+100 ft. East of S-sed-02	PCBs, arsenic, SVOCs
S-sed-05	+100 ft. East of S-sed-01	PCBs, arsenic, SVOCs

2.3.3 Shallow Groundwater

During the first round of sampling investigation, three of the Geoprobe soil boring locations were constructed as shallow monitoring wells. All three of the wells were installed on 29 July 2004. During the follow-up sampling investigation, an additional Geoprobe soil boring locations was constructed as a shallow monitoring well. This well was installed on 11 October 2004. Stainless steel well screens equipped with well points were installed using the Geoprobe equipment. The slotted screens had 3-foot lengths and 1.5-inch outside diameters. The riser pipe was also composed of stainless steel having 1.5-inch diameters. The well screen bottom depths were all placed to 10 feet bgs. Steel locking flush-mount well protectors were placed around each monitor wellhead. A concrete pad (collar) was placed around each protector.

On 30 July 2004, the three wells (MW-1, MW-2, and MW-3) were developed using hand bailer methods, removing groundwater until stabilized conditions occurred. Prior to development, static water levels were obtained at each well. Water level measurements were compared with the survey stake elevations located adjacent to each well. Clean disposable 0.75-inch diameter polyurethane bailers were used to obtain the groundwater samples immediately after each well static water levels stabilized. On 11 October 2004, all four monitoring wells were developed following the same procedures. During both rounds of sampling, the groundwater samples were analyzed for VOCs, metals, cyanide, ammonia, phenols, nitrates, pH, thiocyanate, and specific conductance (SC). Insufficient sample volume was recovered from MW-1 during the second round of sampling, thus this sample was analyzed for VOCs only.

Table 3 summarizes the groundwater sampling and analytical protocol used for the Site Investigation. Figure 2 shows the well locations.

Table 3—Groundwater Sampling & Analysis Plan

Well Designation/Location	Lab Parameters
MW-01 (North; E200, N1000)	VOCs, metals, pH, SC, thiocyanate, cyanide, ammonia, phenols, nitrates; VOCs only during 2nd round of sampling
MW-02 (Southwest; E100, N100)	VOCs, metals, pH, SC, thiocyanate, cyanide, ammonia, phenols, nitrates
MW-03 (Central East; E400, N400)	VOCs, metals, pH, SC, thiocyanate, cyanide, ammonia, phenols, nitrates
MW-04 (Central; E200, N600)	VOCs, metals, pH, SC, thiocyanate, cyanide, ammonia, phenols, nitrates

2.3.4 Reconnaissance for Asbestos Debris

Throughout the course of the investigation, the study area was examined for surface and near surface debris and potential asbestos-containing material (ACM). In the event that suspect materials were identified, samples would have been collected and laboratory tested for asbestos content by polarized light microscopy (PLM). During the Site Investigation, no ACMs were observed. Therefore, no samples were collected for PLM analysis.

2.3.5 Data Quality Objectives

Sampling protocols and laboratory methods followed IEPA and USEPA-approved methods. Illinois EPA practical quantitation limits (PQLs) established under the Illinois Site Remediation Program and TACO regulations were used by the laboratory. Laboratory analysis was conducted by an Illinois EPA-accredited laboratory, STL Laboratories, Inc. of University Park, Illinois.

3.0 Report of Findings of Site Investigation

Results of sampling and analysis of chemical data were assessed through comparison with IEPA published risk-based remediation objectives. The IEPA Tiered Approach to Cleanup Objectives (TACO) in 35 IAC Part 742, Tier I for residential settings was used for soil and sediment data comparison. The Class I groundwater remediation objectives were used in comparing the shallow groundwater data. In addition, IEPA sediment quality guidelines were used in comparing the sediment results.

3.1 Subsurface Soils Data/Findings

The first round of soil analytical data indicated that no SVOCs were detected above the Tier I soil remediation objectives (SROs). The metals concentrations were within the accepted IEPA background range for metropolitan areas. Exceedances of PCBs above the Tier I SRO (1 mg/kg) were documented at locations S-07, S-10, S-1, S-13, S-18, S-19, S-29, S-23, S-25, S-26, and S-27. The PCB concentrations ranged from 1.6 to 730 mg/kg. The highest concentrations were found in the northwest corner of the site near the OMC North Ditch and the eastern OMC PCB containment cell. Figure 2 depicts these PCB impacted areas. High PCB concentrations at boring locations S-23 and S-25 are most noteworthy. Table 4 summarizes the PCB analytical results which exceed the IEPA Tier 1 residential standard.

Table 4
Soil Data Compared to TACO Tier 1 Soil Remediation Objectives
All concentrations in mg/kg

Sample ID	Chemical Compound Exceeding IEPA SRO	Measured Concentration (mg/kg)	IEPA Tier 1 Residential Soil Remediation Objective (SRO)
S-7 (0-3 ft)	Aroclor 1248	1.7	1
S-10 (0-3 ft)	Aroclor 1248	2.5	1
S-11 (5-8 ft)	Aroclor 1242	1.6	1
S-13 (0-3 ft)	Aroclor 1242	2.8	1
S-18 (0-3 ft)	Aroclor 1248	1.2	1
S-18 (5-8 ft)	Aroclor 1248	1.2	1
S-19 (5-8 ft)	Aroclor 1248	1.8	1
S-20 (5-8 ft)	Aroclor 1248	2	1
S-23 (5-8 ft)	Aroclor 1248	**280**	1
S-25 (0-3 ft)	Aroclor 1248	**730**	1
S-25 (5-8 ft)	Aroclor 1248	**690**	1
S-26 (0-3 ft)	Aroclor 1248	2.1	1
S-26 (5-8 ft)	Aroclor 1248	8.1	1
S-27 (0-3 ft)	Aroclor 1248	9.8	1

3.2 Sediment Data/Findings

The analytical results for sediment samples document elevated PCB concentrations at the north drainage ditch locations SED-01, SED-04, SED-06, and SED-07, with concentrations ranging from 1.5 mg/kg to 12 mg/kg. These levels exceed the IEPA Tier I SRO. Slightly elevated levels of one SVOC, benzo(a)pyrene, was documented at locations SED-01, SED-06, and SED-07, with concentrations ranging from 0.15 mg/kg to 0.35 mg/kg. Although this SVOC was above the Tier I SRO, it was below the IEPA's published background level. The metal arsenic was found to have a slightly elevated concentration of 15 mg/kg at location SED-02, with higher concentrations at upstream locations SED-06 (160 mg/kg) and SED-07 (31 mg/kg). This metal exceeded both the Tier 1 SRO and the IEPA background level. The highest concentrations of all elevated constituents were measured in SED-06, which is the most upstream sample and is closest to the former OMC North Plant discharge. No constituents exceeded Tier I SRO at locations SED-05, SED-08, and SED-09. The summary of sediment results are shown on Table 5. The north drainage ditch sediment sample results were also compared to the

IEPA ecological sediment quality standards. The concentrations of PCBs, arsenic and PAHs were also above these standards, and are shown on Table 6.

For the south drainage ditch sediment samples, the analytical results documented elevated PCB concentrations at SED-01, SED-02, SED-04, and SED-05. The PCB concentrations ranged from 5.8 mg/kg ast SED-01 to 150 mg/kg at SED-02. These concentrations exceed the Tier I SRO. The metal arsenic exceeded the Tier I SRO and IEPA background with a concentration of 22 mg/kg at SED-02 and 37 mg/kg at SED-05. At SED-02, lead exceeded the IEPA background, having a concentration of 39 mg/kg. This concentration; however, does not exceed the Tier I SRO. Five SVOCs were detected having concentrations above the Tier I SRO; however, they did not exceed or only slightly exceeded the IEPA background levels. These SVOCs included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(ah)anthracene, and indeno(1,2,3-cd)pyrene. Dibenzo(a,h)anthracene and benzo(b)fluoranthene slightly exceeded background at SED-05. No exceedances were found in SED-03, the most downstream sample location. These results are shown on Table 5. The results of the south drainage ditch sediment samples were also compared to the IEPA ecological sediment quality standards for PCBs, arsenic, copper, and PAHs. These results are shown on Table 6.

Table 5
Sediment Data Compared to TACO Tier 1 Soil Remediation Objectives
All concentrations in mg/kg

Sample ID	Chemical Compound Exceeding IEPA SRO	Measured Concentration	IEPA Tier 1 Residential Soil Remediation Objective	IEPA Background (within MSA)
North SED-01	Aroclor 1248	4.6	1	--
	Benzo(a)pyrene	0.16	0.09	2.14
North SED-02	Arsenic	15	--	13
North SED-04	Aroclor 1248	1.5	1	--
North SED-05	No constituents exceed Tier 1 SRO			
North SED-06	Aroclor 1016	3.5 U	1	--
	Aroclor 1221	3.5 U	1	
	Aroclor 1232	3.5 U	1	
	Aroclor 1242	3.5 U	1	
	Aroclor 1248	12	1	
	Arcolor 1254	3.5 U	1	
	Aroclor 1260	3.5 U	1	
	Arsenic	160	--	13
	Benzo(a)pyrene	0.35	0.09	2.14
North SED-07	Aroclor 1248	1.7	1	
	Arsenic	31	--	13
	Benzo(a)pyrene	0.15	0.09	2.14
North SED-08	No constituents exceed Tier 1 SRO			
North SED-09	No constituents exceed Tier 1 SRO			

Table 5 (continued)
Sediment Data Compared to TACO Tier 1 Soil Remediation Objectives
All concentrations in mg/kg

Sample ID	Chemical Compound Exceeding IEPA SRO	Measured Concentration	IEPA Tier 1 Residential Soil Remediation Objective	IEPA Background (within MSA)
South SED-01	Aroclor 1248	5.8	1	--
	Benzo(a)pyrene	0.14	0.09	2.14
South SED-02	Aroclor 1016	22 U	1	--
	Aroclor 1221	22 U	1	--
	Aroclor 1232	22 U	1	--
	Aroclor 1242	22 U	1	--
	Aroclor 1248	150	1	--
	Arcolor 1254	22 U	1	--
	Aroclor 1260	22 U	1	--
	Arsenic	22	--	13
	Benzo(a)pyrene	0.92	0.09	2.14
	Benzo(b)fluoranthene	1.5	0.9	2.05
	Dibenzo(ah)anthracene	0.11	0.09	0.422
	Lead	39	400	36
South SED-03	No constituents exceed Tier 1 SRO			
South SED-04	Aroclor 1016	2.1 U	1	--
	Aroclor 1221	2.1 U	1	--
	Aroclor 1232	2.1 U	1	--
	Aroclor 1242	2.1 U	1	--
	Aroclor 1248	8.7	1	--
	Arcolor 1254	2.1 U	1	--
	Aroclor 1260	2.1 U	1	--
	Benzo(a)pyrene	0.2	0.09	2.14
South SED-05	Aroclor 1016	14 U	1	--
	Aroclor 1221	14 U	1	--
	Aroclor 1232	14 U	1	--
	Aroclor 1242	14 U	1	--
	Aroclor 1248	76	1	--
	Arcolor 1254	14 U	1	--
	Aroclor 1260	14 U	1	--
	Arsenic	37	--	13
	Benzo(a)anthracene	1.6	0.9	1.84
	Benzo(a)pyrene	1.7	0.09	2.14
	Benzo(b)fluoranthene	2.6	0.9	2.05
	Dibenzo(a,h)anthracene	0.47	0.09	0.422
	Indeno(1,2,3-cd)pyrene	1.3	0.9	1.552

NA = Not available.
MSA=Metropolitan Statistical Area
U = Not detected above method detection limit. Elevated detection limits are reported due to high concentrations of other Aroclors.
-- = Not available.

Table 6
Sediment Data Compared to IEPA Sediment Quality Guidelines
All concentrations in mg/kg

Sample ID	Chemical Compound Exceeding IEPA Sediment Quality Guideline	Measured Concentration (mg/kg)	IEPA Provisional Classification: Non-elevated	IEPA Provisional Classification: Highly Elevated	IEPA Baseline Sediment Cleanup Objectives for Petroleum Product Releases
North SED-01	Aroclor 1248	4.6	<0.01	0.48	--
	Arsenic	12	7.2	18	--
	Benzo(a)pyrene	0.16	--	--	0.073
North SED-02	Aroclor 1248	0.90	<0.01	0.48	--
	Arsenic	15	7.2	18	--
North SED-03	Aroclor 1248	0.56	<0.01	0.48	--
	Arsenic	9.7	7.2	18	--
North SED-04	Aroclor 1248	1.5	<0.01	0.48	--
	Arsenic	18	7.2	18	--
North SED-06	Anthracene	0.099			
	Aroclor 1248	12	<0.01	0.48	--
	Arsenic	160	7.2	18	--
	Benzo(a)anthracene	0.39	--	--	0.287
	Benzo(a)pyrene	0.35	--	--	0.073
	Chyrsene	0.45	--	--	0.400
	Fluorene	0.059	--	--	0.035
	Pyrene	0.78	--	--	0.350
North SED-07	Aroclor 1248	1.7	<0.01	0.48	--
	Arsenic	31	7.2	18	--
	Benzo(a)pyrene	0.15	--	--	0.073
North SED-08	Aroclor 1248	0.70	<0.01	0.48	--
	Arsenic	13	7.2	18	--
North SED-09	Aroclor 1248	0.068	<0.01	0.48	--
	Arsenic	6.7	7.2	18	--

Table 6 (continued)
Sediment Data Compared to IEPA Sediment Quality Guidelines
All concentrations in mg/kg

Sample ID	Chemical Compound Exceeding IEPA Sediment Quality Guideline	Measured Concentration (mg/kg)	IEPA Provisional Classification: Non-elevated	IEPA Provisional Classification: Highly Elevated	IEPA Baseline Sediment Cleanup Objectives for Petroleum Product Releases
South SED-01	Aroclor 1248	5.8	<0.01	0.48	--
	Arsenic	11	7.2	18	--
	Benzo(a)pyrene	0.14	--	--	0.073
South SED-02	Aroclor 1248	150	<0.01	0.48	--
	Arsenic	22	7.2	18	--
	Benzo(a)anthracene	0.53	--	--	0.287
	Benzo(a)pyrene	0.92	--	--	0.073
	Benzo(b)fluoranthene	1.5	--	--	0.886
	Chrysene	1.1	--	--	0.4
	Copper	55	37	170	--
	Dibenzo(ah)anthracene	0.11	--	--	0.06
	Flourene	0.036	--	--	0.035
	Pyrene	1.2	--	--	0.35
South SED-03	Aroclor 1248	4.9	<0.01	0.48	--
	Benzo(a)pyrene	0.080	--	--	0.073
South SED-04	Aroclor 1248	8.7	<0.01	0.48	--
	Benzo(a)pyrene	0.2	--	--	0.073
	Pyrene	0.5	--	--	0.35
South SED-05	Anthracene	0.34	--	--	0.085
	Aroclor 1248	76	<0.01	0.48	--
	Arsenic	37	7.2	18	--
	Benzo(a)anthracene	1.6	--	--	0.287
	Benzo(a)pyrene	1.7	--	--	0.073
	Benzo(b)fluoranthene	2.6	--	--	0.886
	Chrysene	3.0	--	--	0.40
	Dibenzo(a,h)anthracene	0.47	--	--	0.06
	Fluoranthene	4.8	--	--	2.79
	Fluorene	0.21	--	--	0.035
	Phenanthrene	2.7	--	--	0.81
	Pyrene	4.2	--	--	0.35

Short, Matthew. 1997. Evaluation of Illinois Sieved Stream Sediment Data 1982-1995. IEPA, Bureau of Water. August 1997.
Only constituents positively detected at concentrations exceeding sediment guidelines are presented; no exceedance was measured at North SED-05.

3.3 Shallow Groundwater Data/Findings

The analytical results for the two rounds of groundwater samples indicate concentrations of certain metals above the IEPA Class I groundwater remediation objectives. The metals commonly exceeding these objectives included arsenic, barium, chromium, iron, lead, manganese, nickel, vanadium and zinc. These results are shown on Table 7.

Table 7
Groundwater Compared to TACO Class I Groundwater Remediation Objectives
All concentrations in mg/L

Sample ID	Chemical Compound Exceeding Class I Groundwater Remediation Objective	Round 1 Measured Concentration	Round 2 Measured Concentration	Class I Groundwater Remediation Objective
MW-01	Barium	4	NA	2
	Chromium	0.35	NA	0.1
	Iron	86	NA	5
	Lead	0.24	NA	0.0075
	Manganese	2.6	NA	0.15
	Nickel	0.17	NA	0.1
	Vanadium	0.077	NA	0.049
	Zinc	29	NA	5
	Thiocyanate	<0.1	NA	--
MW-02	Arsenic	0.074	0.11	0.05
	Chromium	0.43	0.12	0.1
	Iron	43	28	5
	Lead	0.32	0.15	0.0075
	Manganese	1.1	0.67	0.15
	Nickel	0.2	< GRO	0.1
	Zinc	25	14	5
	Thiocyanate	<0.1	<0.10	--
MW-03	Chromium	0.11	< GRO	0.1
	Iron	38	24	5
	Lead	0.18	0.15	0.0075
	Manganese	0.92	0.6	0.15
	Zinc	21	15	5
	Thiocyanate	<0.1	<0.10	--
MW-04	Cadmium	NA	0.006	0.005
	Chromium	NA	0.22	0.1
	Iron	NA	44	5
	Lead	NA	0.073	0.0075
	Manganese	NA	1.8	0.15
	Nickel	NA	0.17	0.1
	Thiocyanate	<0.1	<0.10	--

Round 1 samples collected 30 July 2004.
Round 2 samples collected 11 October 2004.
< Detected concentration below groundwater remediation objective (GRO).
NA - Not analyzed; sufficient sample volume not available for collection.
-- = No groundwater remediation objective available.

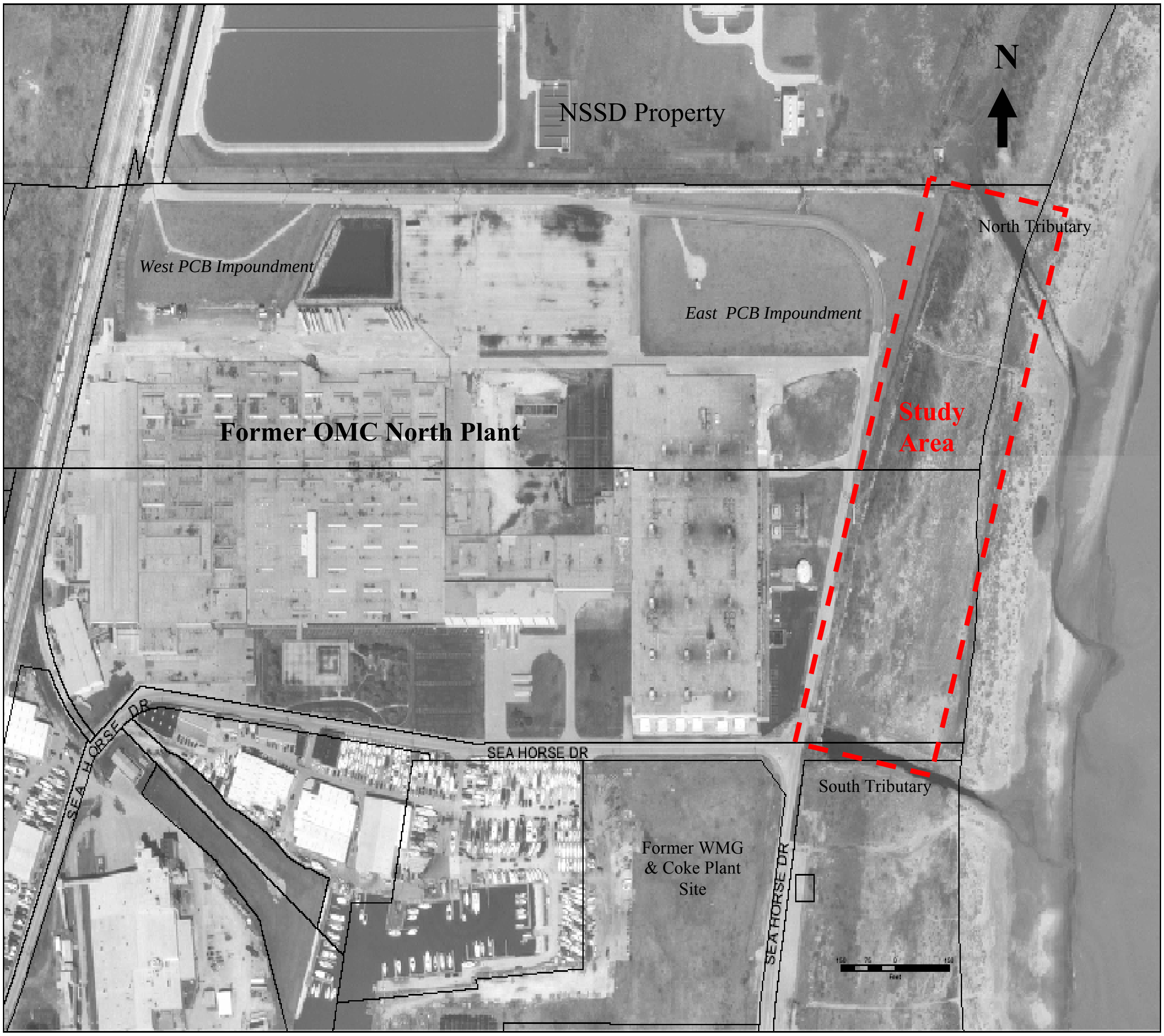
4.0 Recommendations

The results of this environmental investigation are encouraging and continue to support future use of the study area east of the OMC North Plant for conservation open space, passive recreational use, and natural habitat development. Despite the legacy of industrial use and releases of hazardous substances from the OMC North Plant and its related Superfund Site Operable Units, the 13-acre lakefront portion of the property has remained for the most part not impacted by hazardous substance releases.

USEPA's Remedial Project Manager for the OMC Site will be informed of the presence of moderately elevated PCB and Arsenic concentrations in the North and South tributaries and high PCB concentrations in soil in the northwest corner of the property via transmittal of this report. Areas of elevated PCB concentrations have been found in soil which appears to be limited to the northwest corner of the study area and in sediments of the north and south tributaries. There is potential for direct contact with this PCB-contaminated soil and sediment and potential for migration to Lake Michigan. Soil at borings S-23 and S-25 reported PCB concentrations ranging from 280 mg/kg to 730 mg/kg in the vicinity of the eastern PCB containment cell and the previously remediated North Ditch Area. Public access to these areas should continue to be restricted until further contaminant removal and/or containment is conducted. Currently, natural vegetative and water barriers are present that may preclude access to PCBs in sediments in the north and south tributaries.

Other areas of the study area appear acceptable for planning limited public access and continued natural habitat restoration and protection consistent with the City of Waukegan's Lakefront Master Plan.

Figure 1
Environmental Investigation Study Area



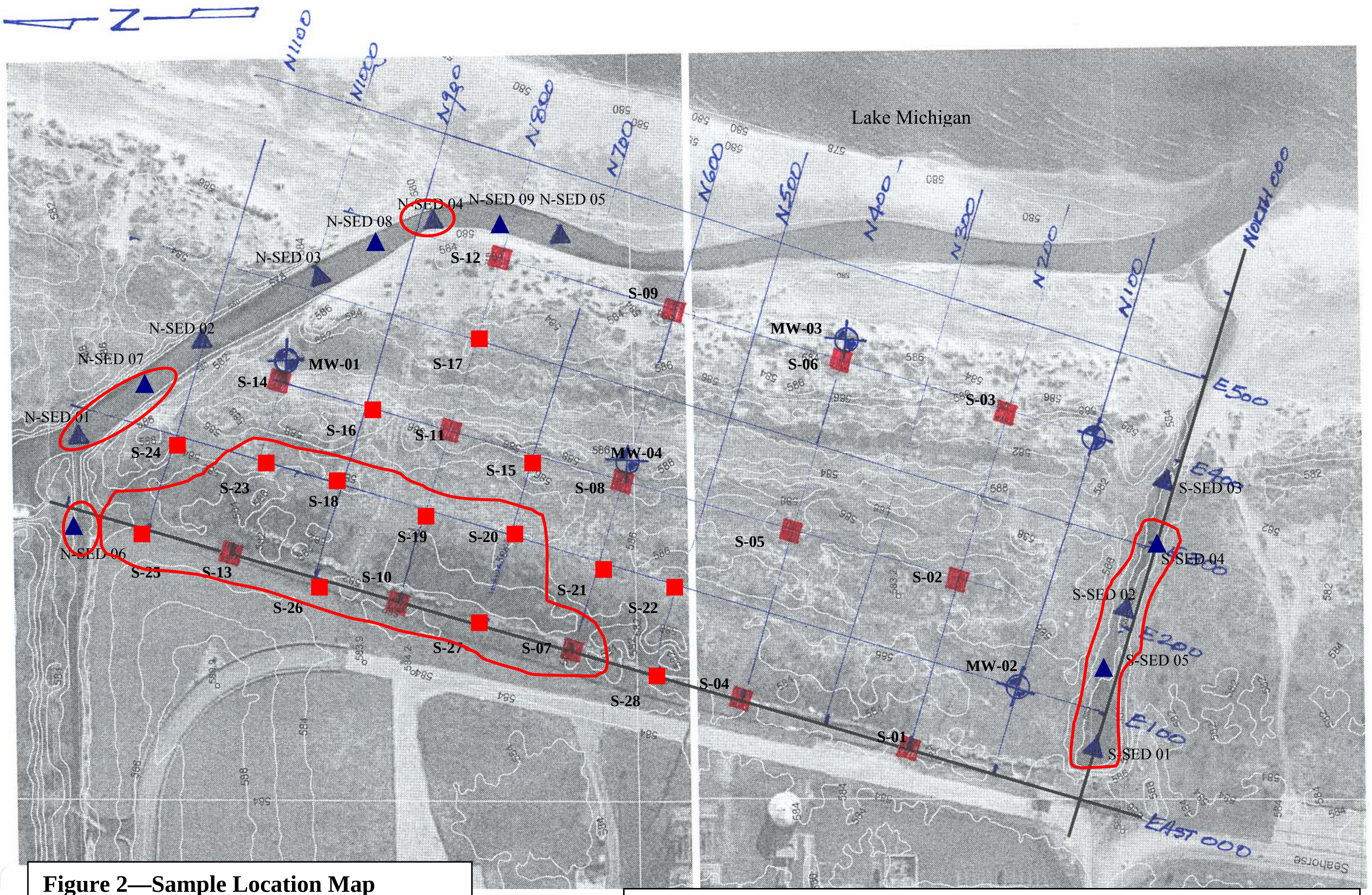


Figure 2—Sample Location Map
MW—Monitoring Well
SED—Sediment Sample
S-Soil Probe Sample Location

July 2004 and October 2004 Data:
PCB Soil Exceedances: S-7, S-10, S-11, S-13, S-18, S-19, S-20, S-23, S-25, S-26, S-27
PCB Sediment Exceedances: N-SED-01, N-SED-04, N-SED-06, N-SED-07
S-SED-01, S-SED-02, S-SED-04, S-SED-05

Appendix A

Study Area Photos

July 2004 Sediment Sampling—North Tributary

Photo of well installation work during July 2004 Site Investigation

Typical Sample Core (Above) & Habitat Protection
Survey Markers (Bottom) July 2004

Appendix B

Soil Boring/Monitoring Well Logs

Deigan & Associates

BORING NUMBER SP- 01

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E00, N200	

COMMENTS Offset approximately 10 feet west, outside fence.

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, occasional pebbles, well sorted, loose, dry to damp. PID = ND		SP
4			As above, becoming gray, wet below 4.5 feet bgs. PID = ND		SP

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend

SILTY CLAY	Organic topsoil	SILT
SANDY CLAY	SAND	
CC = Continuous Core	ST = Shelby Tube	GP = Geo-Probe
SS = Split Spoon	AS = AugerSample	HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 02

PROJECT	OMC Lakefront Study	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	2 inches
TOTAL DEPTH	8 ft.	DEPTH TO WATER	None Observed
TOC ELEV.	N/A	DRILLING METHOD	Geo-Probe
COMPANY	CS Drilling	DATE DRILLED	July 28, 2004
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	E200, N200		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, damp to moist. PID = ND		SP
4			Gray fine sand, well sorted, medium dense, wet. PID = ND		SP
8					

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Collect soil samples from 0 to 3' / 5 to 8' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend: SILTY CLAY; SANDY CLAY; Organic topsoil; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER MW- 02

PROJECT	OMC Lakefront Study	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	2 inches
TOTAL DEPTH	10 ft.	DEPTH TO WATER	3.6' below concrete pad (95.75 el)
TOC ELEV.	N/A	DRILLING METHOD	Geo-Probe
COMPANY	CS Drilling	DATE DRILLED	July 29, 2004
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	E100, N100		
COMMENTS			

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, dry to damp. PID = ND		SP
2					
4					
6					
8					
10					
12					
14					
16					
18					
20					

No soil sampling; blind hole to 10' bgs.

Converted soil boring to temporary monitoring well using 1.5-inch dia. S.S. materials, 3-foot screen section from 7 to 10' bgs. Natural sand used for well point; no seal.

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER **SP- 03**

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 4 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 29, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E400, N200	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample	Int.	Type
0			Brown fine sand, well sorted, loose, dry to moist. PID = ND			SP
2						
4						
6			Collect soil sample from 0 to 3' bgs (composite) for SVOCs, metals, PCBs and Ph. Collect soil sample from 2' bgs (discrete) for VOCs.			
8						
10						
12						
14						
16						
18						
20						

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 04

PROJECT	OMC Lakefront Study	PROJECT NO.	
LOCATION	Waukegan, Illinois	BOREHOLE DIA.	2 inches
TOTAL DEPTH	8 ft.	DEPTH TO WATER	None Observed
TOC ELEV.	N/A	DRILLING METHOD	Geo-Probe
COMPANY	CS Drilling	DATE DRILLED	July 28, 2004
DRILLER		GEOLOGIST	Kerry Van Allen
LOCATION	E00, N400		

COMMENTS Offset approximately 15 feet to the west, outside fence.

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, occasional pebbles, well sorted, loose, dry to damp. PID = ND		SP
2					
4			As above, becoming gray fine sand, wet below 4.5 feet. PID = ND		SP
6					
8					
10					
12					
14					
16					
18					
20					

Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend: SILTY CLAY; SANDY CLAY; Organic topsoil; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 05

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E200, N400	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample	Int.	Type
0			Brown fine sand, well sorted, loose, dry to damp. PID = ND			SP
2						
4			As above, becoming gray, wet below 7 feet bgs. PID = ND			SP
6						
8						
10			Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph. Collect soil samples from 2' / 6' bgs (discrete) for VOCs.			
12						
14						
16						
18						
20						

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

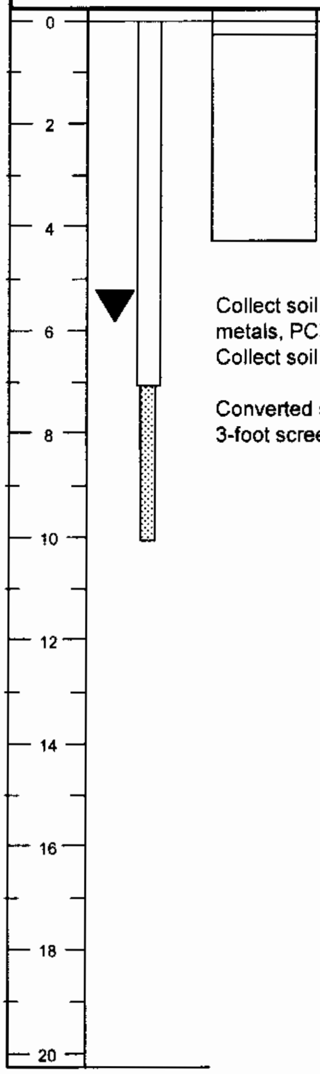
CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 06 / MW - 03

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 4 ft.	DEPTH TO WATER 5.7' below concrete pad (95.65 el)
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 29, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E400, N400	
COMMENTS Offset approximately 10 feet west.	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, damp to moist. PID = ND		SP



Collect soil sample from 0 to 3' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil sample from 2' bgs (discrete) for VOCs.

Converted soil boring to temporary monitoring well using 1.5-inch dia. stainless steel materials, 3-foot screen section from 7 to 10' bgs. Natural sand use for well point; no seal.

Legend

SILTY CLAY	Organic topsoil	SILT
SANDY CLAY	SAND	
CC = Continuous Core	ST = Shelby Tube	GP = Geo-Probe
SS = Split Spoon	AS = AugerSample	HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 07

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E00, N600	

COMMENTS Offset approximately 30 feet west, outside fence.

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample	Int.	Type
0			Brown fine sand, well sorted, loose, dry to moist. PID = ND			SP
2						
			Black fine sand below 3' bgs, damp to moist. PID = ND			SP
4			As above, saturated below 6' bgs.			SP
6						
8						
10						
12						
14						
16						
18						
20						

Collect soil samples from 0 to 3' / 5 to 8' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend: SILTY CLAY; SANDY CLAY; Organic topsoil; SAND; SILT

CC = Continuous Core; SS = Split Spoon; ST = Shelby Tube; AS = AugerSample; GP = Geo-Probe; HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 08

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E200, N600	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, dry to damp. PID = ND		SP
2					
4			As above, becoming gray fine sand, wet below 7.5 feet. PID = ND		SP
6					
8					
10					
12					
14					
16					
18					
20					

Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend: SILTY CLAY; SANDY CLAY; Organic topsoil; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 08 / MW - 04

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 9 ft.	DEPTH TO WATER Observed in borehole @ 7.5' bgs
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED October 8, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E200, N600	
COMMENTS Offset approximately 20 feet west.	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, damp to moist. PID = ND		SP
4			As above, becoming wet. PID = ND		SP
7			As above, becoming saturated below 7.5 feet. PID = ND		SP

No soil samples collected during drilling.
Converted soil boring to temporary monitoring well using 1.5-inch dia. stainless steel materials, 3-foot screen section from 6 to 9' bgs. Natural sand use for well point; no seal.

Legend: SILTY CLAY; SANDY CLAY; Organic topsoil; SAND; SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER **SP- 09**

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 4 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 29, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E400, N600	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0–4			Brown fine sand, well sorted, loose, dry to damp. PID = ND		SP

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Collect soil sample from 0 to 3' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil sample from 2' bgs (discrete) for VOCs.

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 10

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E400, N400	

COMMENTS Offset approximately 30 feet west, outside fence.

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, damp to moist. PID = ND		SP
			Below 1.5' bgs, dark gray to black fine sand, damp to wet. PID = ND		
2					
4			As above, saturated. PID = ND		SP
6					
8					
10					
12					
14					
16					
18					
20					

Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 11

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E200, N800	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, dry to moist. PID = ND	■	SP
4			As above, gray fine sand, saturated below 7.5' bgs.	■	SP
8					

Collect soil samples from 0 to 3' / 5 to 8' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Legend

▤	SILTY CLAY	□	Organic topsoil	■	SILT
■	SANDY CLAY	□	SAND		

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 12

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 4 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 29, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E400, N800	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0–4			Brown fine sand, well sorted, loose, damp to moist. PID = ND		SP

Collect soil sample from 0 to 3' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil sample from 2' bgs (discrete) for VOCs.

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP- 13

PROJECT OMC Lakefront Study	PROJECT NO.
LOCATION Waukegan, Illinois	BOREHOLE DIA. 2 inches
TOTAL DEPTH 8 ft.	DEPTH TO WATER None Observed
TOC ELEV. N/A	DRILLING METHOD Geo-Probe
COMPANY CS Drilling	DATE DRILLED July 28, 2004
DRILLER	GEOLOGIST Kerry Van Allen
LOCATION E00, N1000	
COMMENTS	

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, dry to damp. PID = ND		SP
2			Below 1.5', dark gray to black fine sand, damp to wet. PID = ND		
4			As above, saturated. PID = ND		SP
6					
8					
10			Collect soil samples from 0 to 3' / 5 to 8' bgs (composite) for SVOCs, metals, PCBs and Ph. Collect soil samples from 2' / 6' bgs (discrete) for VOCs.		
12					
14					
16					
18					
20					

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Deigan & Associates

BORING NUMBER SP-14 / MW- 01

PROJECT OMC Lakefront Study
LOCATION Waukegan, Illinois
TOTAL DEPTH 8 ft.
TOC ELEV. N/A
COMPANY CS Drilling
DRILLER
LOCATION E200, N1000
COMMENTS

PROJECT NO.
BOREHOLE DIA. 2 inches
DEPTH TO WATER 8.5' below concrete pad (94.92 el)
DRILLING METHOD Geo-Probe
DATE DRILLED July 28, 2004
GEOLOGIST Kerry Van Allen

Depth (ft)	Well Record	Graphic Log	Description Soil Classification	Sample Int.	Sample Type
0			Brown fine sand, well sorted, loose, dry to damp. PID = ND		SP
4			As above, wet below 7.5' bgs. PID = ND		SP

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20

Collect soil samples from 0 to 3' / 5 to 7' bgs (composite) for SVOCs, metals, PCBs and Ph.
Collect soil samples from 2' / 6' bgs (discrete) for VOCs.

Converted soil boring to temporary monitoring well using 1-inch dia. PVC materials, 3-foot screen section from 7 to 10' bgs. Natural sand around well point used; no seal.

Legend

SILTY CLAY
SANDY CLAY
Organic topsoil
SAND
SILT

CC = Continuous Core
SS = Split Spoon
ST = Shelby Tube
AS = AugerSample
GP = Geo-Probe
HSA = Hollow-Stem Auger

Note:
Soil logs were not prepared for the 2nd Round soil sampling due to similarity of site soils determined by logging 1st round soil borings.

Appendix C

Laboratory Data Reports

2005 Investigation Results

Table 1
Amended Results of PCB Sampling in Soils—OMC Beachfront Property Area
(Amended to include May 2005 further delineation)

Sample ID	Chemical Compound Exceeding IEPA SRO of 1 mg/kg	Measured Concentration (mg/kg)	Excavation Depth Recommended	Approximate Excavation Area & Bank Measure Volume (cy)
S-7 (0-3 ft)	PCB--Aroclor 1248	1.7		
S-10 (0-3 ft)	Aroclor 1248	2.5		
S-11 (5-8 ft)	Aroclor 1242	1.6		
S-13 (0-3 ft)	Aroclor 1242	2.8		
S-18 (0-3 ft)	Aroclor 1248	1.2		
S-18 (5-8 ft)	Aroclor 1248	1.2		
S-19 (5-8 ft)	Aroclor 1248	1.8		
S-20 (5-8 ft)	Aroclor 1248	2		
S-23 (5-8 ft)	Aroclor 1248	**280**	0 to 9 ft.	40x40x9/27=533 cy
S-25 (0-3 ft)	Aroclor 1248	**730**	0 to 9 ft.	60x30x9/27=600 cy
S-25 (5-8 ft)	Aroclor 1248	**690**	0 to 9 ft.	included above
S-26 (0-3 ft)	Aroclor 1248	2.1		
S-26 (5-8 ft)	Aroclor 1248	**8.1**	4 to 9 ft.	100x20x5/27=370 cy
S-27 (0-3 ft)	Aroclor 1248	**9.8**	0 to 4 ft.	100x20x4/27=300 cy
May 2005				
S-29 (2 ft.)	PCB—Aroclor 1248	**16**	0 to 6 ft.	30x50x6/27=333 cy
S-29 (6 ft.)	Aroclor 1248	1.3		
S-30 (2 ft.)	Aroclor 1248	1.2		
S-30 (6 ft.)	Aroclor 1248	1.3		
S-31 (2 ft.)	Aroclor 1248	3.2		
S-32 (2 ft.)	Aroclor 1248	**6.2**	0 to 3 ft.	50x50x3/27=278 cy
S-34 (2 ft.)	Aroclor 1248	**14,000**	0 to 6 ft.	50x50x6/27=555 cy
S-36 (6 ft.)	Aroclor 1248	3.7		
S-37 (6 ft.)	Aroclor 1248	1.5		
S-40 (6 ft.)	Aroclor 1248	2.8		
S-41 (6 ft.)	Aroclor 1248	3.9		
S-47 (6 ft.)	Aroclor 1248	**17**	0 to 7 ft.	30x40x7/27=312 cy
			Estimated Total	**3,300 cy**

Shaded soil sample locations above having PCB levels near or above 10 mg/kg have been identified for removal consistent with USEPA's PCB spill cleanup regulations cited below.

40 CFR Section 761.125 Requirements for PCB Spill Cleanup
Soil contaminated by the spill will be decontaminated to 10 ppm PCBs by weight provided that soil is excavated to a minimum depth of 10 inches. The excavated soil will be replaced with clean soil, i.e., containing less than 1 ppm PCBs, and the spill site will be restored.

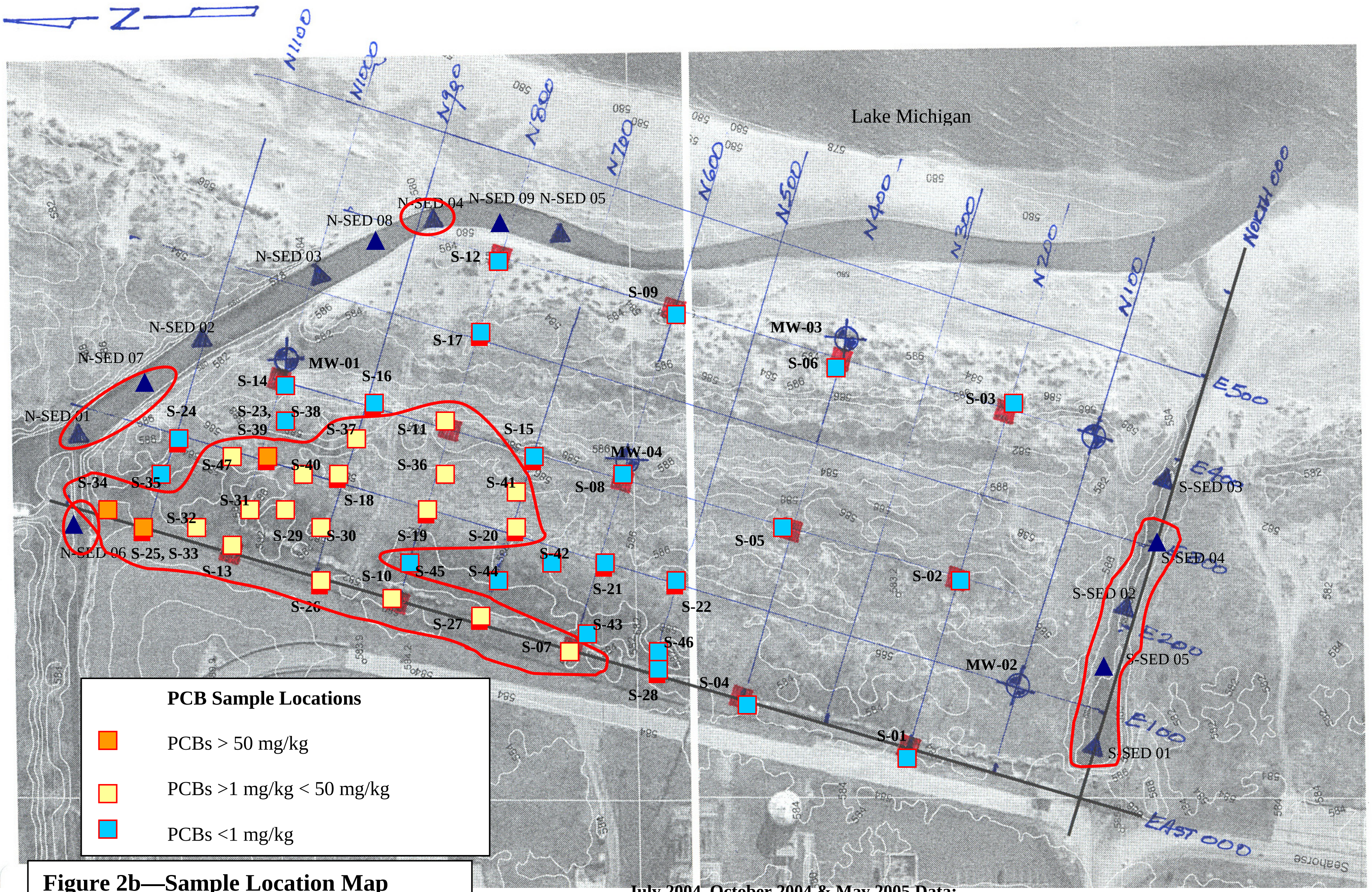


Figure 2b—Sample Location Map
MW—Monitoring Well
SED—Sediment Sample
S-Soil Probe Sample Location

July 2004, October 2004 & May 2005 Data:
PCB Soil Exceedances: S-7, S-10, S-11, S-13, S-18, S-19, S-20, S-23, S-25, S-26, S-27, S-29, S-30, S-31, S-32, S-34, S-36, S-37, S-40, S-41, S-47
PCB Sediment Exceedances: N-SED-01, N-SED-04, N-SED-06, N-SED-07; S-SED-01, S-SED-02, S-SED-04, S-SED-05

Appendix B
Investigation Technical Memorandums

Building Materials Investigation OMC Plant 2 (Operable Unit 4), Waukegan, Illinois WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR: USEPA

PREPARED BY: CH2M HILL

DATE: October 13, 2005

Introduction

This memorandum documents the activities associated with the Building Materials Investigation completed as part of the remedial investigation at the Outboard Marine Corporation Plant 2 (OMC Plant 2) site in Waukegan, Illinois. The investigation included the periodic collection of wipe samples, concrete cores, and paint and concrete chip samples between December 13, 2004, and April 8, 2005.

The overall objective of sampling the building materials (metal structures, piping, concrete walls, and floors) was to provide the data to determine if residual contamination exists that may impact future actions considered for the building and handling and disposal options for building materials, and not to evaluate the extent of contamination. Polychlorinated biphenyl (PCB) contamination was identified in the Old Die Cast, Parts Storage, and Metal Working Areas during the discovery and removal activities conducted by USEPA.

This memorandum includes the following:

- Description of specific field activities performed, including locations, methods, and deviations from the site-specific project plans
- A summary of sample locations, analyses, and observations
- Photodocumentation of the sample locations (see Attachment 1)

Investigation Activities

The activities completed for this investigation included concrete coring, wipe sampling of metal and other nonporous surfaces, wipe sampling of porous surfaces, and concrete/paint chip sampling. The objectives and sampling activities for the different types of building materials are described below.

Metal Structures and Piping (nonporous surfaces)

Wipe sampling of metal and other nonporous surfaces (defined within the Toxic Substances Control Act (TSCA) [40 CFR 761.3] as a smooth, unpainted solid surface that limits penetration of liquid containing PCBs beyond the immediate surface) for PCBs was conducted. The data will be used to determine the proportion of metal that will require decontamination and, if contaminated (i.e., above 10 µg/100 cm^2), the type of thermal treatment or disposal that may be required.

Sample Number and Locations

The locations and numbers of the wipe samples were determined during the site reconnaissance at the start of the field investigation. During this activity, the locations and condition of unpainted overhead piping, metal girders, and other unpainted metal surfaces in the Old Die Cast, Parts Storage, and Metal Working Areas (i.e., the areas where PCB contamination were previously identified) were identified and sketched on a facility map. A photographic record of the building interior was also created. Evidence of visual contamination, such as the presence of an oily film, was noted on the sketch to allow later correlation to PCB wipe results.

Based on the site reconnaissance, 49 initial locations were selected from throughout the OMC Plant 2 building to represent the nonporous building materials (Figure 1). The description of the sample location and visual evidence of contamination are presented in Table 1.

Upon review of the preliminary PCB results and discussions with USEPA, the nonporous wipe sampling was expanded east into the Trim Building and New Die Cast Area (Figure 1). This additional investigation included 15 additional locations of nonporous materials.

The wipe location coordinates (northing and easting) were identified from known survey locations or estimated with a measuring tape from known survey locations and transferred to a site map.

Sampling Activities

The location to be sampled was identified using the map and photos prepared during site reconnaissance activities. Using an electric lift, sampling personnel were lifted into position near the sample location. A disposable aluminum template with a 100-cm^2 opening was placed on the sample location. The cotton sample pad preserved with hexane was removed from a clean glass jar and any excess hexane was contained in a glass jar for future disposal.

The sample area within the template was then wiped from left to right and from top to bottom using the hexane-soaked cotton pad. If a co-located sample was required, a new disposable aluminum template and clean hexane-soaked cotton pad were used. After sample collected was completed, the disposable aluminum template was decontaminated and placed in the trash.

Wipe samples were collected and submitted to CT Laboratories in Baraboo, Wisconsin, to be analyzed for PCBs. All wipe samples were collected in accordance with the procedures presented in the field sampling plan

Wipe samples collected from nonporous (unfinished metal) surfaces were submitted for PCB analysis to CT Laboratories of Baraboo, Wisconsin.

Porous Surfaces Other Than Floors

Wipe samples from porous surfaces (defined within TSCA [40 CFR 761.3] as "…any surface that allows PCBs to penetrate or pass into itself including, but not limited to, paint or coating on metal; corroded metal; …"), such as concrete block walls, painted metal walls, painted piping, and painted girders that are not visibly contaminated, were collected and analyzed for PCBs to confirm that concentrations are less than 10 µg/100 cm^2.

Sample Location and Number

The locations for the wipe samples were also determined during the site reconnaissance. During the reconnaissance, the condition (e.g., flaking paint) and locations of the porous interior walls in the Old Die Cast, Parts Storage, and Metal Working Areas (i.e., the areas where PCB contamination were previously identified) were identified on a facility map. Evidence of visual contamination, such as the presence of an oily film, was also noted on the sketch to allow later correlation to PCB wipe results. A photographic record was also created of the sample locations.

Sixty-two porous wipe locations were initially sampled based on the site reconnaissance (Figure 2). The description of the sample location and visual evidence of contamination are presented in Table 1.

Review of the preliminary PCB results from the wipe samples identified 8 locations with PCB concentrations greater than 100 µg/100 cm^2 within the Old Die Cast Area, Parts Storage Area, and the Metal Working Area. In accordance with the *Field Sampling Plan* (FSP) (CH2M HILL, 2004), bulk samples (paint or concrete chips) were collected from these locations for comparison to the 50-mg/kg TSCA disposal criteria. Two additional chip sample locations, PW-015 and PW-043, which had porous wipe sample results < 100 µg/100 cm^2, were also sampled to provide information on a wider range of porous materials. Sample location descriptions are provided in Table 1.

PCB wipe and paint/concrete chip sample location coordinates (northing and easting) were identified from known survey locations or estimated with a measuring tape from known survey locations and transferred to a site map.

Sampling Procedures

The location to be sampled was identified using the map and photos prepared during site reconnaissance activities. Using an electric lift, sampling personnel were lifted into position near the sample location. A disposable aluminum template with a 100-cm^2 opening was placed on the sample location. The cotton sample pad preserved with hexane was removed from a clean glass jar and any excess hexane was contained in a glass jar for future disposal.

The sample area within the template was then wiped from left to right and from top to bottom using the hexane-soaked cotton pad. If a co-located sample was required, a new disposable aluminum template and clean hexane-soaked cotton pad were used.

Bulk sample locations (paint or concrete chip) identified based on initial porous wipe sample results were cleaned using Alconox® and distilled water before paint or concrete chip collection. Paint chip, concrete chip, and wipe samples were collected and submitted to CT Laboratories in Baraboo, Wisconsin, to be analyzed for PCBs. All wipe samples, paint chip, and concrete chip samples were collected in accordance with the procedures presented in the *Field Sampling Plan* (CH2M HILL, 2004).

Porous Floor Surfaces

Limited concrete core samples were collected and analyzed to determine how deeply PCBs may have penetrated into the floors, the disposal requirements for the concrete, and the potential for residual PCBs and metals to leach from the concrete. Concrete core samples (including different depth intervals at each location) were collected and analyzed for PCBs. The results will be compared to the 50-mg/kg TSCA limit to determine the general proportion of the concrete in the Old Die Cast, Parts Storage, and Metal Working Areas that will require disposal in a Subtitle D landfill versus disposal in a Subtitle C or TSCA chemical waste landfill.

Sample Number and Locations

Twenty-five concrete chip samples were collected from 22 concrete cores installed in the concrete floors of the Old Die Cast, New Die Cast, Parts Storage, and Metal Working Areas (Figure 3). Concrete core thickness and visual evidence of contamination (staining) are shown in Table 2. Concrete core location coordinates (northing and easting) were identified from known survey locations or estimated with a measuring tape from known survey locations and transferred to a site map.

In addition to the locations identified in the FSP, core location CB-015 was included to verify decontamination methods from an area with a previous floor wipe sample result (Figure 3).

Additional samples were collected at three of the concrete core locations (CB-001, CB-002, and CB-021) from depths greater than 4 inches based on visual evidence of contamination. These samples were collected from depths of 4.0 to 6.0 inches, 4.0 to 7.5 inches, and 4.0 to 5.0 inches, respectively, from the top of the concrete.

Discussions with USEPA indicated that the Triax Building was being considered as a potential location of the groundwater treatment plant for the remedial action being conducted at the adjacent Waukegan Coke Plant site. Based on the potential near-term use of the building, the investigation was expanded to include four additional wipe sample locations off the floor of the Triax Building.

Sampling Procedures

Concrete floor locations for bulk concrete sampling were identified using photos and maps developed during site reconnaissance activities. A diamond-bit, electric concrete coring machine was used to remove the concrete core at the sample location. Once the core had been removed, all excess soil from the bottom of the core was removed to prevent cross contamination of the sample. The soil was collected and placed with other soil generated during investigation activities. The concrete core was then placed into a disposable plastic bag, which was placed into a disposable aluminum container. The aluminum container was then struck with a hammer to crush the core, while containing the fragments and preventing cross contamination.

The concrete core was crushed into fragments smaller than 1 inch to facilitate laboratory analysis. The fragments were then removed from the plastic bag and placed into a clean, stainless steel bowl to be homogenized. The homogenized sample was then placed into clean glass jars to be shipped to the laboratory for PCB analysis. All sample collection procedures were performed in accordance with the procedures presented in the *Field Sampling Plan* (CH2M HILL, 2004).

Samples were collected and submitted to CT Laboratories in Baraboo, Wisconsin, to be analyzed for PCBs. The samples and analyses requested are provided in Table 2.

CB-016 was analyzed for toxicity characteristic leaching procedure PCBs when the sample should have been analyzed for target compound list PCBs. This was likely due to a communication error between the field team and sample manager.

Reference

CH2M HILL. 2004. Field Sampling Plan, OMC Plant 2, Waukegan, Illinois, Final. November.

TABLE 1

Building Materials Investigation Wipe/Chip Sample Summary

OMC Plant 2

Location Identifier	Location Description	Date/Sampled	Analyses PCBs	Visually Contaminated
Non-Porous Wipe Samples				
NPW-001	6" Overhead pipe	12/14/2004	X	
NPW-002	2" Sprinkler	12/14/2004	X	
NPW-003	Girder	12/14/2004	X	
NPW-004	3" Overhead pipe	12/14/2004	X	
NPW-005	Fan	12/14/2004	X	X
NPW-006	3" Pipe	12/14/2004	X	
NPW-007	3/4" Pipe	12/14/2004	X	
NPW-008	1.5" Black pipe (lowest)	12/14/2004	X	
NPW-009	3" Aluminum pipe that ends abruptly	12/14/2004	X	
NPW-010	3/4" Pipe (looks like sprinkler)	12/14/2004	X	X
NPW-011	Girder	12/15/2004	X	
NPW-012	3" Pipe next to lights	12/15/2004	X	
NPW-013	3/4" Water pipe (sprinkler)	12/15/2004	X	
NPW-014	1/2" Pipe with plugged ends coming off pipe	12/15/2004	X	
NPW-015	Girder	12/15/2004	X	
NPW-016	8" Pipe	12/15/2004	X	
NPW-017	Wall support	12/15/2004	X	
NPW-018	Catwalk	12/15/2004	X	
NPW-019	Wire chase	12/15/2004	X	
NPW-020	3" Black pipe	12/15/2004	X	
NPW-021	Fan	12/15/2004	X	X
NPW-022	1.5" Pipe along wall	12/15/2004	X	
NPW-023	Catwalk	12/15/2004	X	
NPW-024	1.5" Black pipe	12/15/2004	X	
NPW-025	Girder	12/15/2004	X	
NPW-026	3" or 4" Pipe	12/15/2004	X	
NPW-027	4" Pipe	12/15/2004	X	X
NPW-028	Same 4" pipe as NPW-27	12/15/2004	X	
NPW-029	Girder	12/15/2004	X	
NPW-030	1.5" Black pipe	12/15/2004	X	
NPW-031	Girder	12/15/2004	X	
NPW-032	5" Black pipe	12/15/2004	X	
NPW-033	1.5" Pipe	12/15/2004	X	
NPW-034	Fan	12/16/2004	X	X
NPW-035	Girder	12/16/2004	X	
NPW-036	6" Overhead pipe	12/16/2004	X	
NPW-037	3/4" Sprinkler line	12/16/2004	X	

TABLE 1
Building Materials Investigation Wipe/Chip Sample Summary
OMC Plant 2

Location Identifier	Location Description	Date/Sampled	Analyses PCBs	Visually Contaminated
NPW-038	3/4" Sprinkler line	12/16/2004	X	
NPW-039	Girder	12/16/2004	X	
NPW-040	3/4" Sprinkler line	12/16/2004	X	
NPW-041	3/4" Sprinkler line	12/16/2004	X	X
NPW-042	1.5" Pipe	12/16/2004	X	
NPW-043	3" Pipe	12/16/2004	X	
NPW-044	3-3/4" Pipes	12/16/2004	X	
NPW-045	2" Brown pipe	12/16/2004	X	
NPW-046	Girder	12/16/2004	X	
NPW-047	3" Overhead pipe	12/16/2004	X	
NPW-048	1" Overhead pipe	12/16/2004	X	
Porous Wipe Samples				
PW-001	Girder—painted	12/16/2004	X	
PW-002	Wall	12/16/2004	X	
PW-003	1.5" Pipe	12/16/2004	X	
PW-004	Girder	12/16/2004	X	
PW-005	Girder	12/16/2004	X	
PW-006	Wall	12/15/2004	X	
PW-007	3" White pipe (lateral with oil dripping)	12/16/2004	X	
PW-008	3/4" White pipe on wall	12/16/2004	X	
PW-009	3" White pipe—lowest hanging	12/16/2004	X	
PW-010	Wall	12/14/2004	X	
PW-011	Girder	12/16/2004	X	
PW-012	5" Red pipe	12/16/2004	X	
PW-013	Wall	12/16/2004	X	
PW-014	Wall	12/16/2004	X	
PW-015	Box	12/15/2004	X	
PW-016	Crane	12/16/2004	X	
PW-017	1.5" Pipe along wall	12/16/2004	X	
PW-018	4" Brown pipe	12/16/2004	X	
PW-019	Wall	12/15/2004	X	
PW-020	Concrete wall	12/15/2004	X	
PW-021	Painted wall window sill (porous concrete)	12/15/2004	X	
PW-022	Silver girder	12/15/2004	X	
PW-023	I-beam to floor	12/15/2004	X	X
PW-024	I-beam to floor	12/15/2004	X	
PW-025	Top of light fixture	12/16/2004	X	X
PW-026	Top of light fixture	12/14/2004	X	X

TABLE 1
Building Materials Investigation Wipe/Chip Sample Summary
OMC Plant 2

Location Identifier	Location Description	Date/Sampled	Analyses PCBs	Visually Contaminated
PW-027	Wall	12/14/2004	X	
PW-028	Painted electrical box	12/14/2004	X	
PW-029	Wall	12/14/2004	X	
PW-030	Girder painted	12/14/2004	X	
PW-031	I-beam to floor	12/14/2004	X	X
PW-032	Wall—no paint	12/14/2004	X	
PW-033	Backwall	12/14/2004	X	
PW-034	Electrical boxes overhead—oily	12/14/2004	X	
PW-035	Electrical boxes overhead—oily	12/14/2004	X	
PW-036	I-beam to floor	12/14/2004	X	
PW-037	Electrical boxes overhead—oily	12/15/2004	X	
PW-038	8" Red pipe	12/15/2004	X	
PW-039	8" Red pipe	12/15/2004	X	
PW-040	Wall	12/15/2004	X	
PW-041	3/4" Pipe	12/15/2004	X	
PW-042	Angle iron covering conduit	12/15/2004	X	X
PW-043	Angle Iron—green covering conduit	12/15/2004	X	
PW-044	Electrical boxes overhead	12/15/2004	X	
PW-045	Yellow I-beam support	12/15/2004	X	
PW-046	Electrical box overhead	12/15/2004	X	
PW-047	I-beam to floor	12/14/2004	X	
PW-048	I-beam to floor	12/15/2004	X	
PW-049	Electrical panel overhead	12/16/2004	X	
PW-050	Wall	12/16/2004	X	
PW-051	Wall	12/16/2004	X	
PW-052	Wall	12/16/2004	X	
PW-053	Inside girder—4" Pipe	12/16/2004	X	
PW-054	Wall	12/15/2004	X	
PW-055	Wall	12/15/2004	X	
PW-056	Wall	12/15/2004	X	
PW-057	I-beam to floor	12/16/2004	X	
PW-058	Brown chase for electrical	12/16/2004	X	
PW-059	Lower part of wall	12/15/2004	X	
PW-060	Lower part of wall	12/15/2004	X	
PW-061	Fallen 3" water pipe	12/15/2004	X	
PW-062	Floor wipe sample	4/6/2005	X	
PW-063	Floor wipe sample	4/6/2005	X	
PW-064	Floor wipe sample	4/6/2005	X	

TABLE 1

Building Materials Investigation Wipe/Chip Sample Summary

OMC Plant 2

Location Identifier	Location Description	Date/Sampled	Analyses PCBs	Visually Contaminated
PW-065	Floor wipe sample	4/6/2005	X	
NPW-066	Overhead 1/2" conduit	4/6/2005	X	
NPW-067	Overhead 1" north/south conduit	4/6/2005	X	
NPW-068	Overhead 1.5" pipe running east/west	4/6/2005	X	
NPW-069	Overhead 1.5" pipe running east/west	4/6/2005	X	
NPW-070	Overhead 1.5" pipe running east/west	4/6/2005	X	
NPW-071	Vertical ducts on west wall	4/6/2005	X	
NPW-072	Electrical box cover with 3/4" electrical conduit	4/6/2005	X	
NPW-073	Vertical 2" electrical conduit (set of 2, painted on bottom)	4/6/2005	X	
NPW-074	Top of roll cage for overhead door	4/6/2005	X	
NPW-075	Top of heater shield	4/6/2005	X	
NPW-076	2" electrical pipe conduit	4/6/2005	X	
NPW-077	Top of roll cage for overhead door	4/6/2005	X	
NPW-078	Fan shroud/cover on wall	4/6/2005	X	
NPW-079	Overhead 3" conduit along bottom of east/west catwalk	4/6/2005	X	
NPW-080	4" gas line to heater	4/6/2005	X	

Notes:

a. "PCBs" represents "Polychlorinated Biphenyls."

b. Porous paint/concrete chips collected at PW-016, PW-020, PW-023, PW-025, PW-026, PW-041 through PW-043, PW-059 and PW-061 were all collected on 4/7/2005.

c. All analyses completed by CT Laboratories of Baraboo, WI.

d. Refer to *Quality Assurance Project Plan, OMC Plant 2* (January 2005) for specific analytical test methods used.

TABLE 2

Building Materials Investigation Sample Summary

OMC Plant 2

Concrete Core Samples

Location Identifier	Sample Interval	Date/Sampled	Analyses PCBs	Visually Contaminated	Concrete Slab Thickness
CB-001	0–4"	1/19/2005	X	X	> 34"
CB-001	4–8"	1/19/2005	X	X	> 34"
CB-002	0–4"	1/18/2005	X	X	7.5"
CB-002	4–7.5"	1/18/2005	X	X	7.5"
CB-003	0–4"	1/18/2005	X	X	7.5"
CB-004	0–4"	1/18/2005	X		5.5"
CB-005	0–4"	1/18/2005	X		5.5"
CB-006	0–4"	1/19/2005	X		9.5"
CB-007	0–4"	1/19/2005	X		6.0"
CB-008	0–4"	1/18/2005			6.5"
CB-009	0–4"	1/18/2005	X	X	8.5"
CB-010	0–4"	1/17/2005	X		6.0"
CB-011	0–4"	1/18/2005			6.0"
CB-012	0–4"	1/17/2005	X	X	6.0"
CB-013	0–4"	1/19/2005			8.0"
CB-014	0–4"	1/18/2005		X	8.5"
CB-015	0–4"	1/18/2005		X	6.5"
CB-016[f]	0–4"	1/20/2005			6.5"
CB-017	0–4"	1/17/2005	X		5.0"
CB-018	0–4"	1/19/2005	X	X	8.5"
CB-019	0–4"	1/18/2005	X		7.0"
CB-020	0–4"	1/17/2005	X		6.0"
CB-021	0–4"	1/19/2005	X	X	8.0"
CB-021	4–8"	1/19/2005	X	X	8.0"
CB-022	0–4"	1/18/2005	X	X	5.0"

Notes:

a. "PCBs" represents "Polychlorinated Biphenyls."

b. Concrete core locations CB-008, CB-011, and CB-013 through CB-015 were analyzed for TCL PCBs, TAL metals & cyanide, SPLP PCBs and metals.

c. Concrete core location CB-016 was analyzed for TCLP PCBs.

d. All analyses completed by CT Laboratories of Baraboo, WI.

e. Refer to *Quality Assurance Project Plan, OMC Plant 2* (January 2005) for specific analytical test methods used.

f. CB-016 was analyzed for TCLP PCBs when the sample should have been analyzed for TCL PCBs. This was likely due to a communication error between the field team and sample manager.

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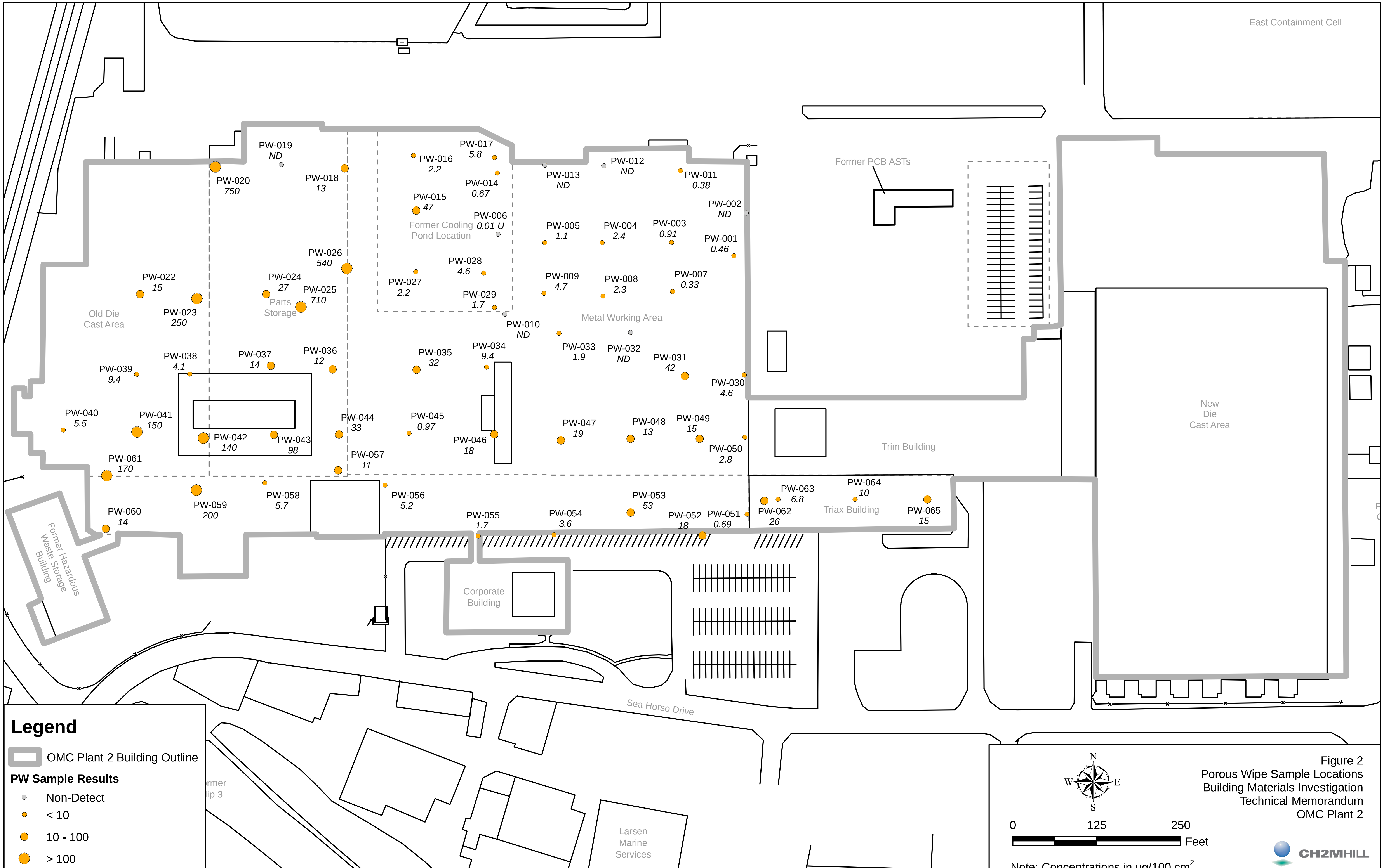

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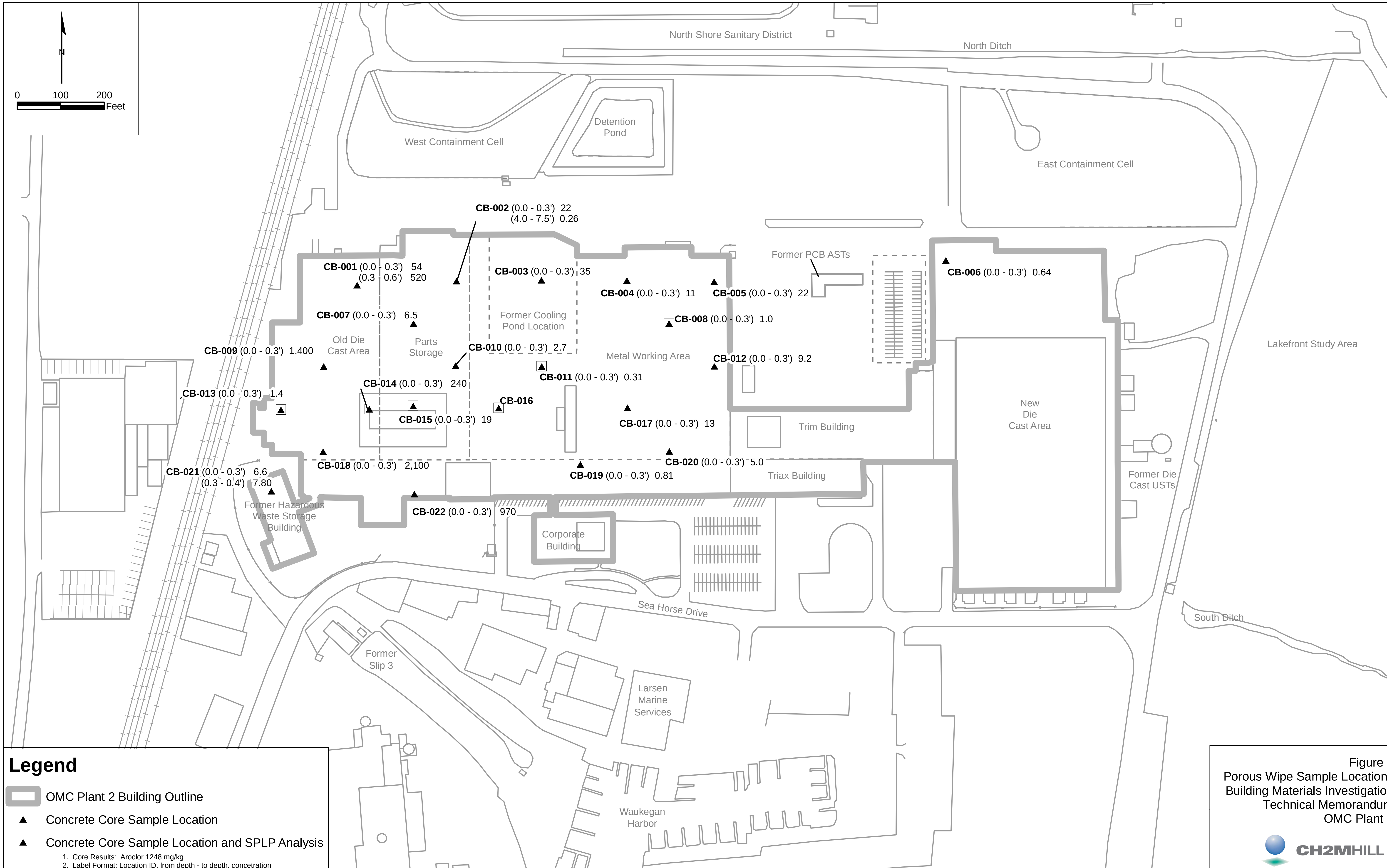

Figure 3
Porous Wipe Sample Locations
Building Materials Investigation
Technical Memorandum
OMC Plant 2

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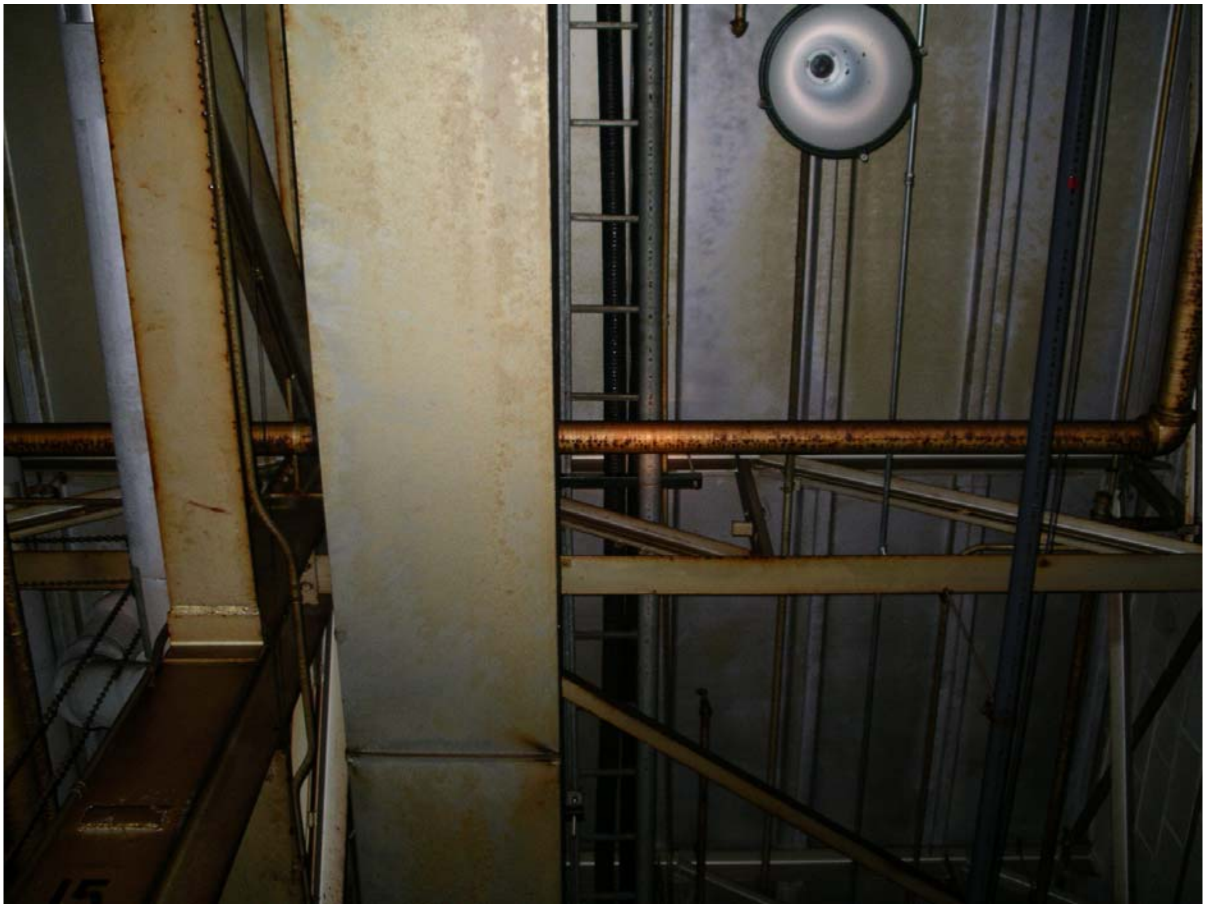
Attachment 1

Sample Location Photographs

NPW-001

NPW-002

NPW-003



NPW-004

NPW-005

NPW-006

NPW-007

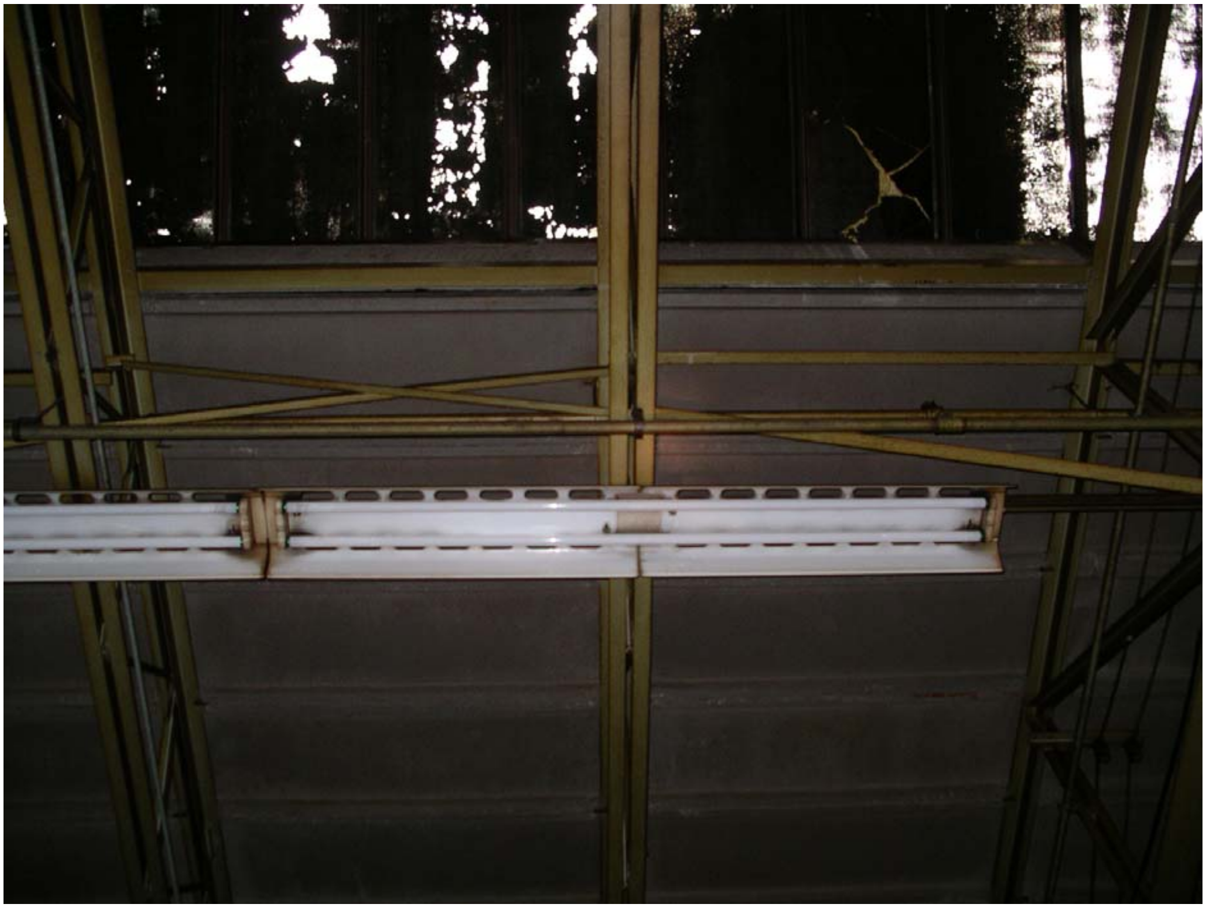
NPW-008

NPW-009

NPW-010

NPW-011

NPW-012



NPW-013

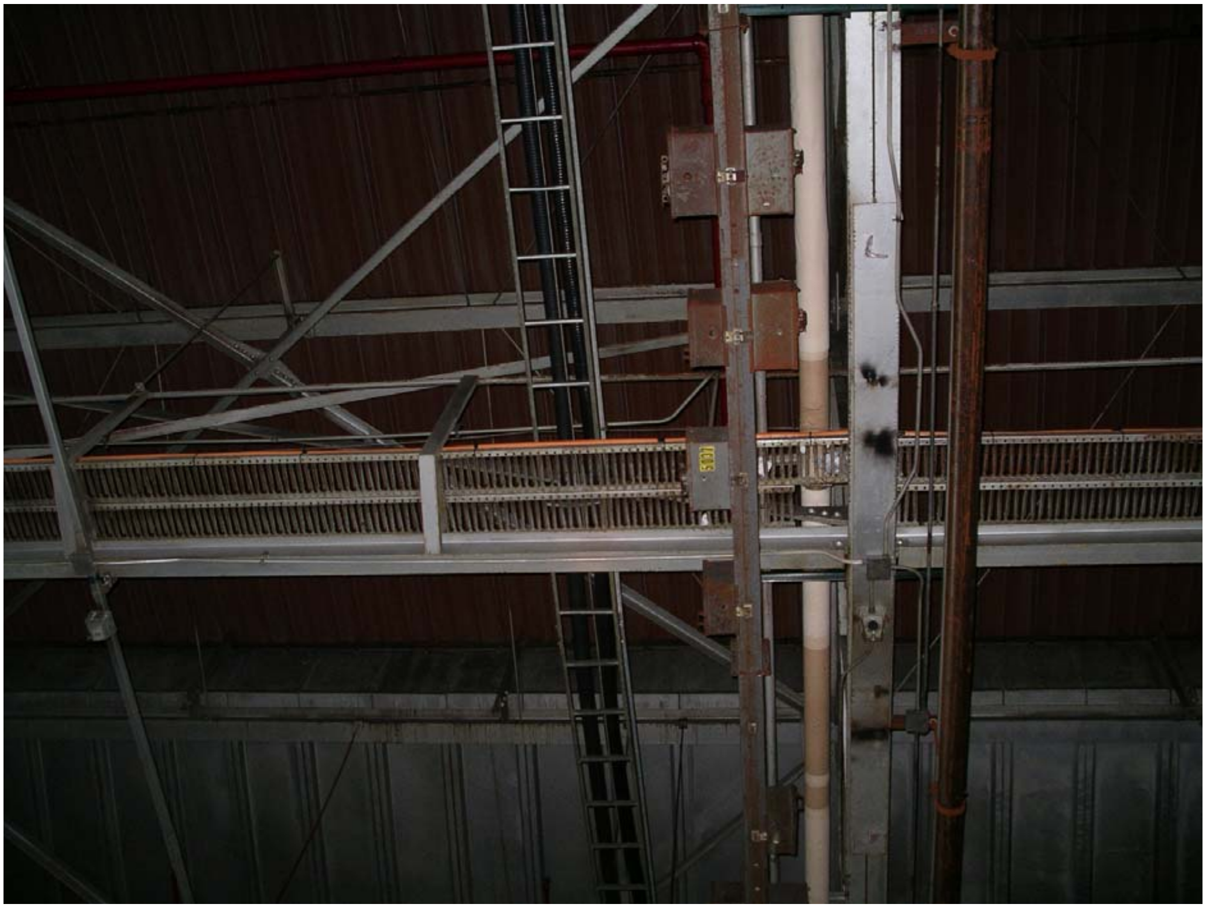
NPW-014

NPW-015

NPW-016

NPW-017

NPW-018



NPW-019

NPW-020

NPW-021

NPW-022

NPW-023

NPW-024

NPW-025

NPW-026

NPW-027

NPW-028

NPW-029

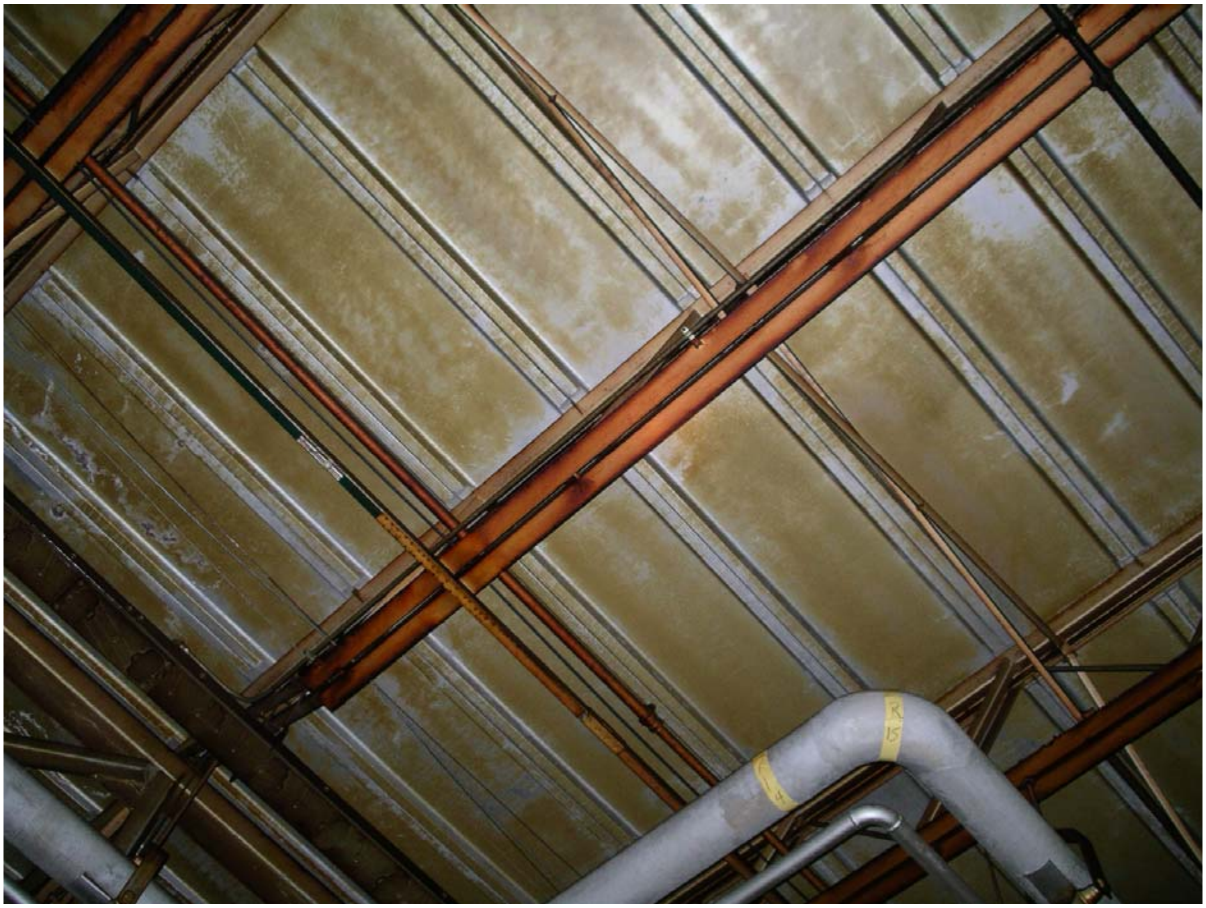
NPW-030

NPW-031

NPW-032

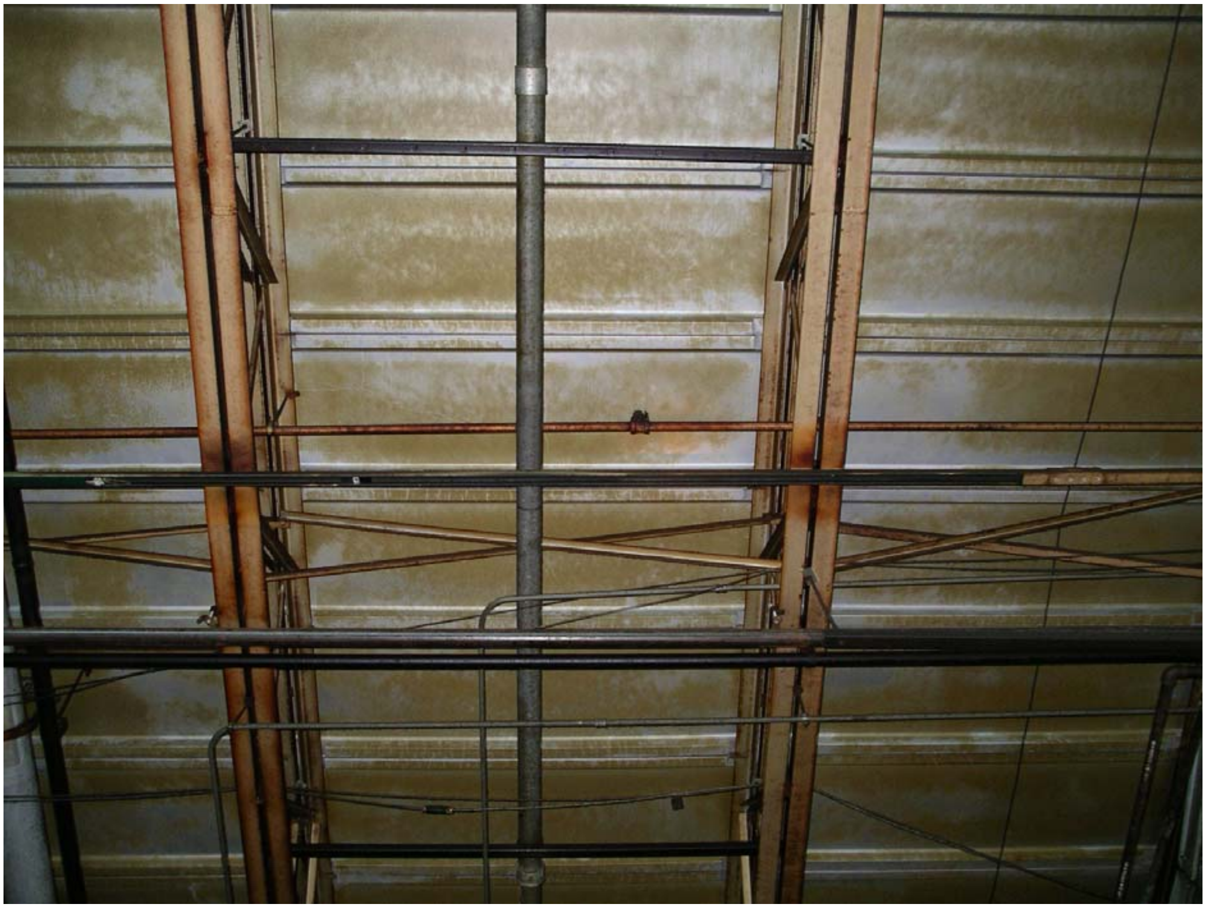
NPW-033

NPW-034



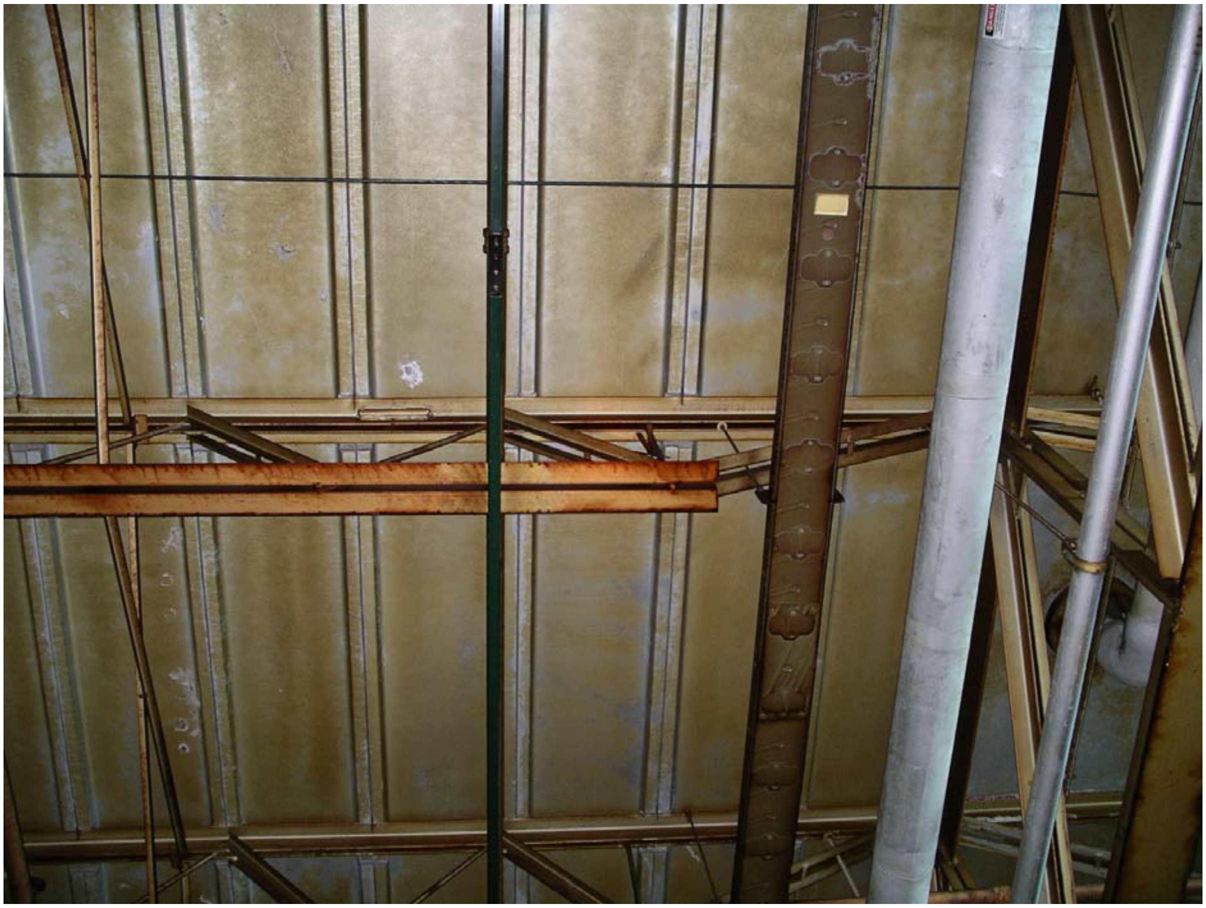
NPW-035

NPW-036



NPW-037

NPW-038



NPW-039

NPW-040

NPW-041

NPW-042

NPW-043

NPW-044

NPW-045

NPW-046

NPW-047

NPW-048

NPW-066

NPW-067

NPW-068

NPW-069

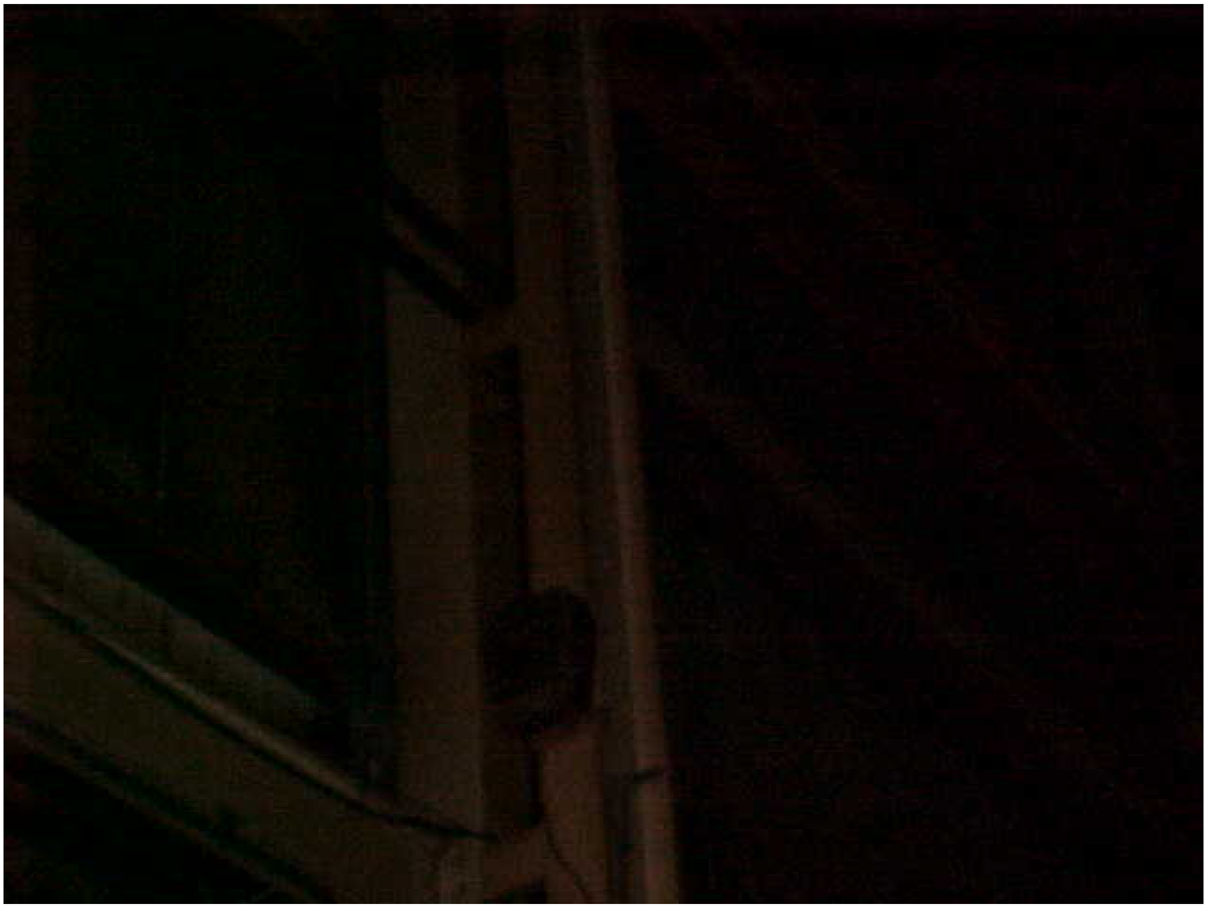
NPW-070

NPW-071

NPW-072

NPW-073

NPW-074



NPW-076

NPW-077

NPW-078

NPW-080

PW-001

PW-002

PW-003

PW-004

PW-005

PW-006

PW-007

PW-008

PW-009

PW-010

PW-011

PW-012

PW-013

PW-014

PW-015

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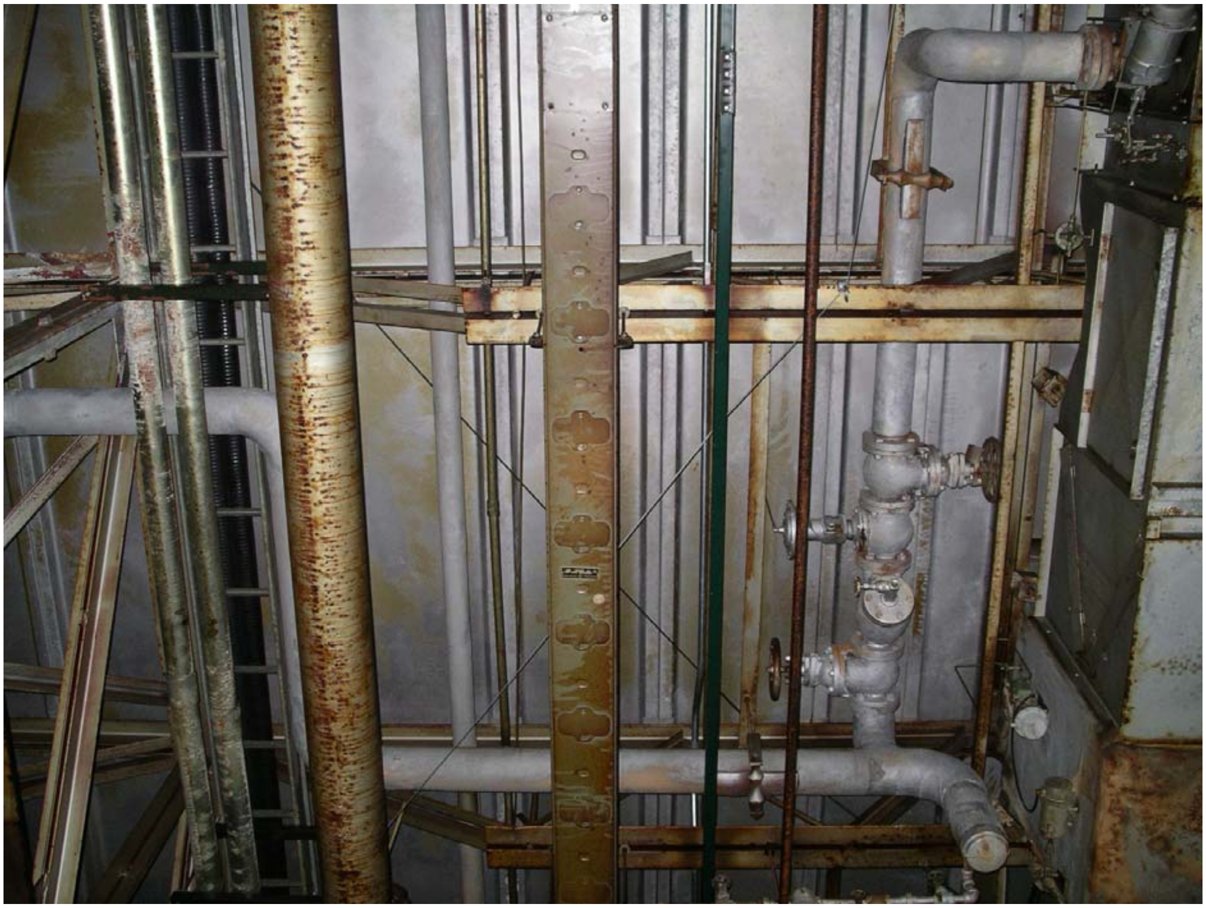
PW-031

PW-032

PW-033



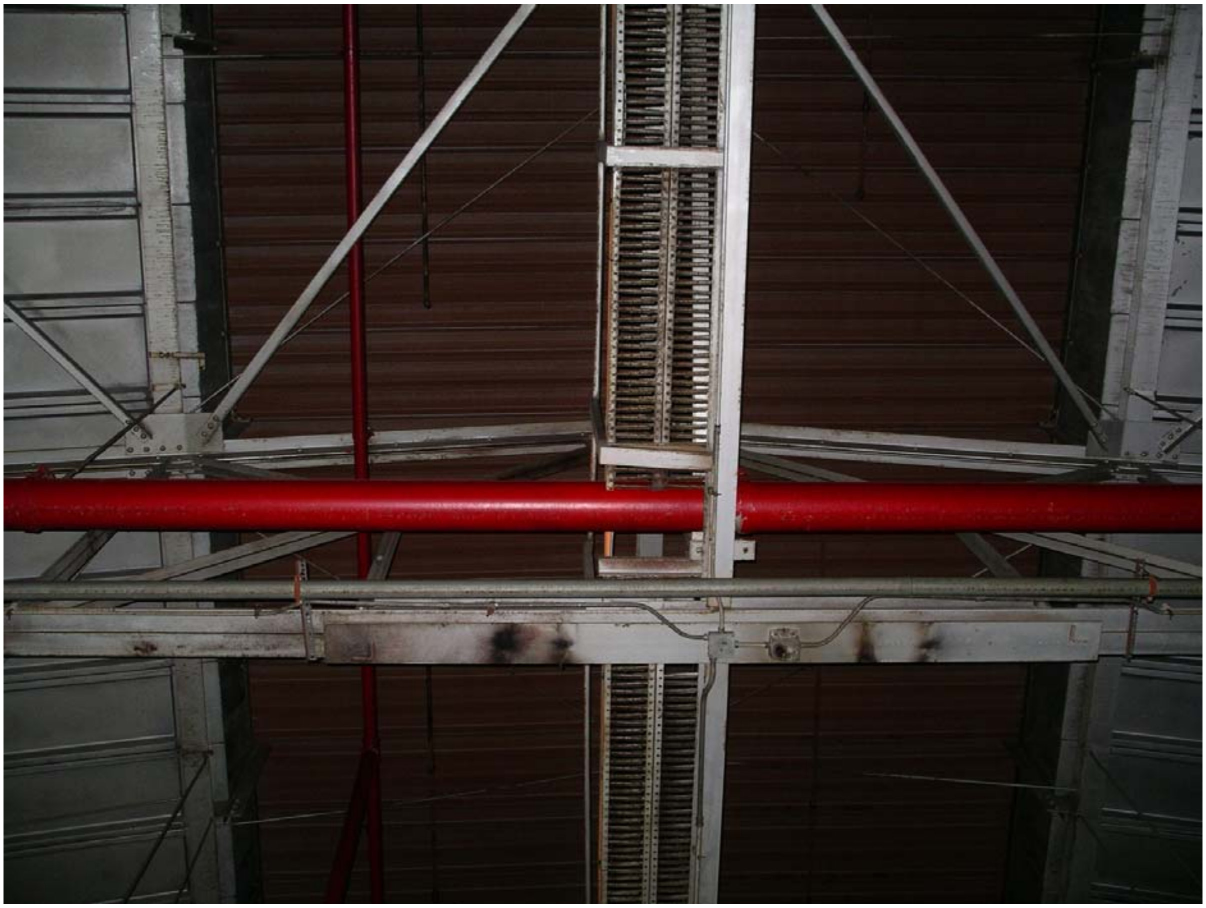
PW-034

PW-035

PW-036

PW-037


PW-038



PW-039

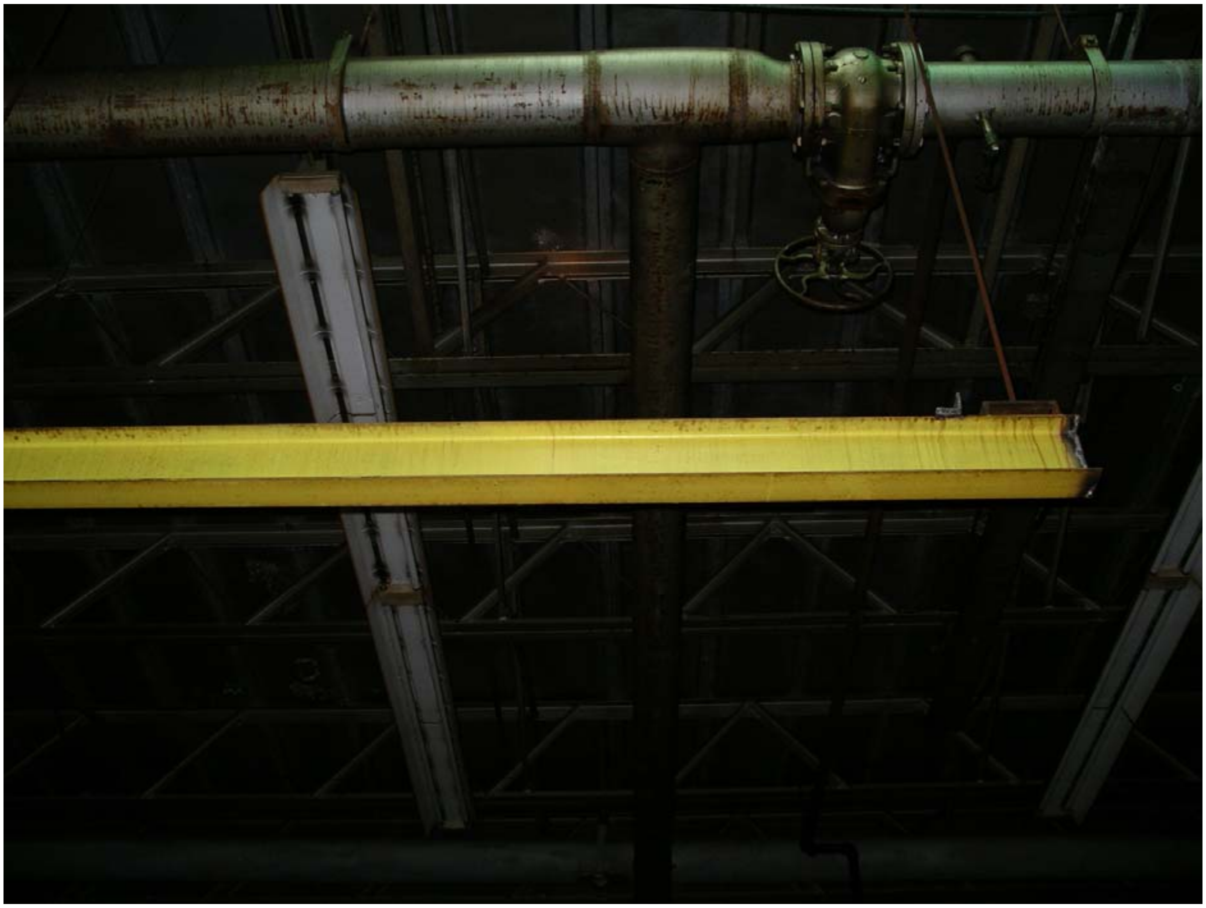
PW-040

PW-041

PW-042

PW-043

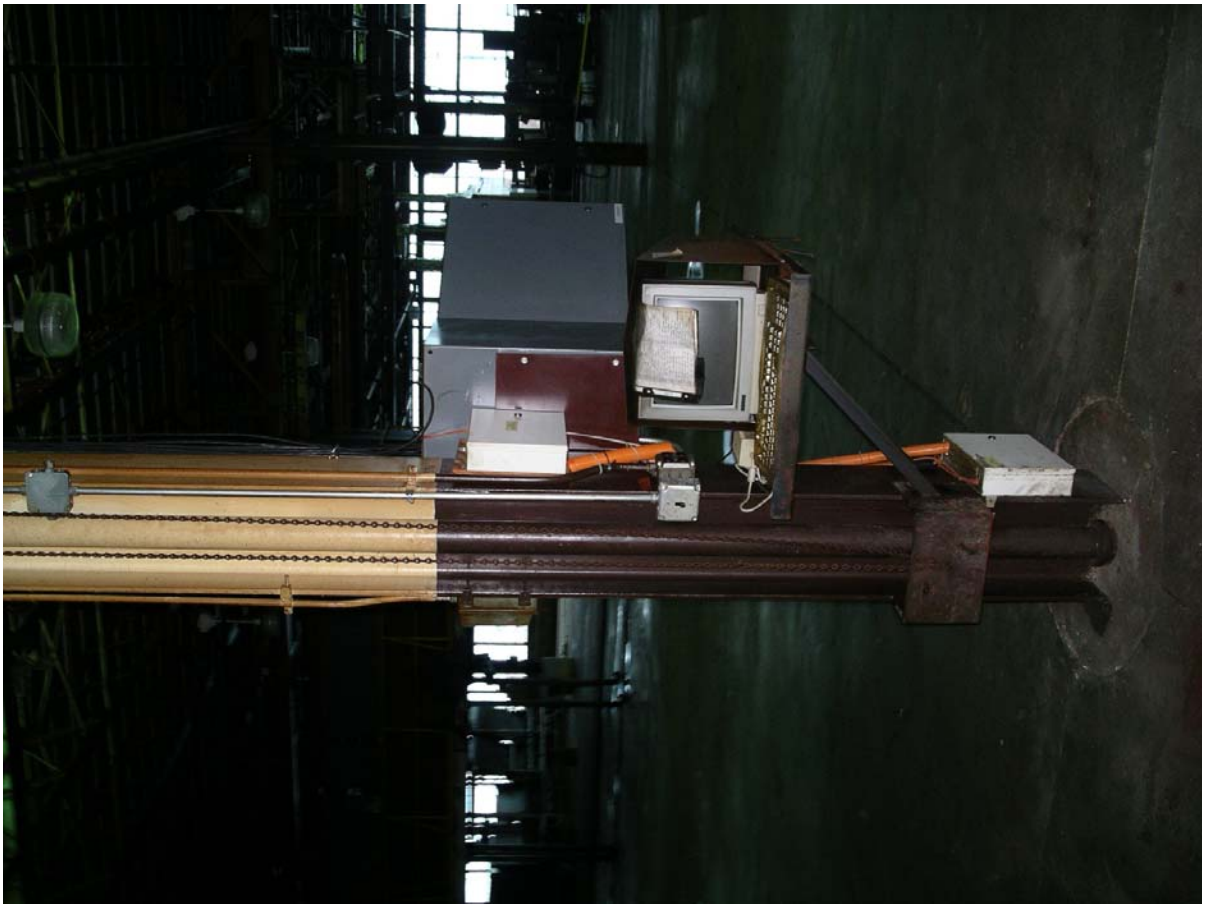
PW-044



PW-045

PW-046

PW-047



PW-048

PW-049

PW-050

PW-051

PW-052

PW-053

PW-054

PW-055

PW-056

PW-057

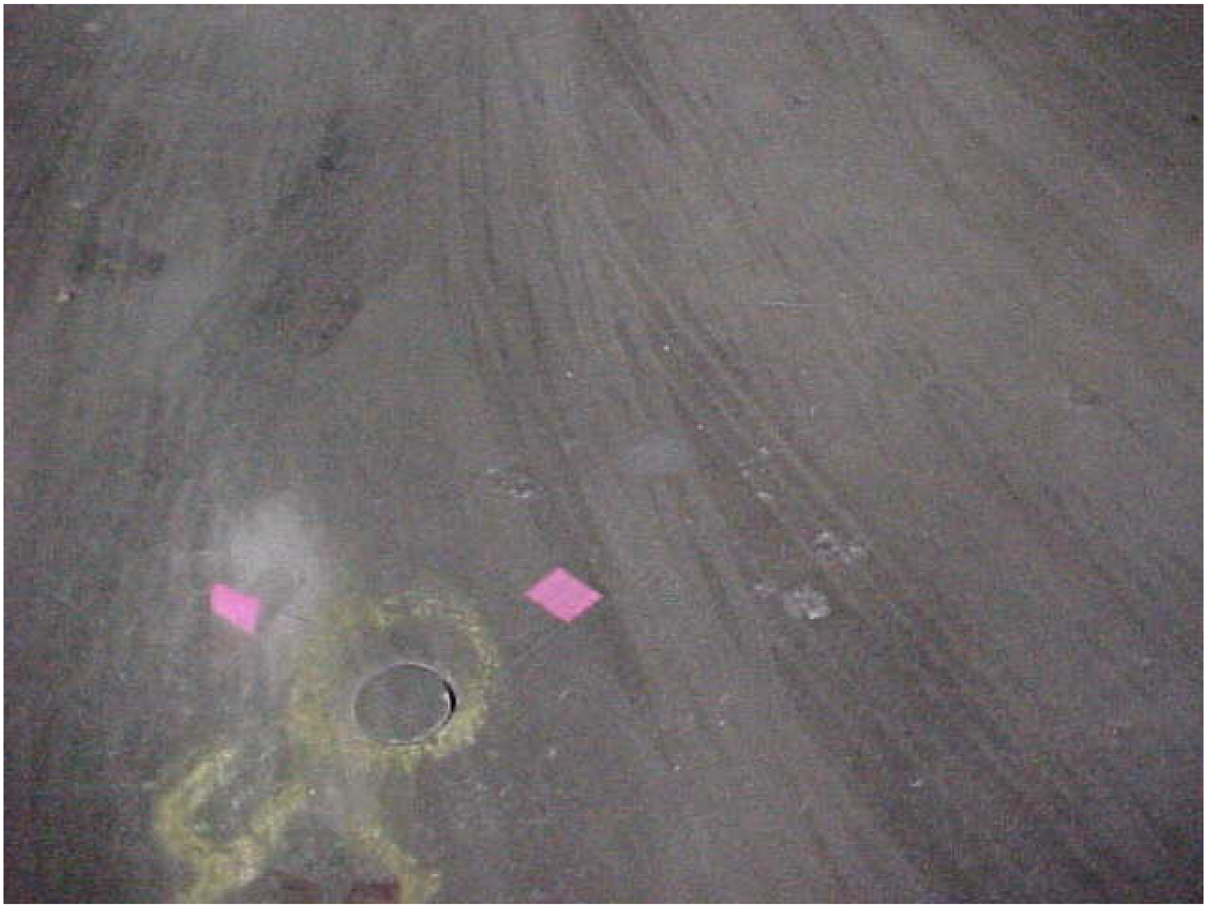
PW-058

PW-059

PW-060

PW-061

PW-062



PW-063

PW-064

PW-065

Soil and Sediment Investigation
OMC Plant 2 (Operable Unit 4), Waukegan, Illinois
WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR: USEPA

PREPARED BY: CH2M HILL

DATE: October 13, 2005

Introduction

This memorandum documents the activities associated with Soil and Sediment Investigation completed at part of the Remedial Investigation (RI) at the Outboard Marine Corporation Plant 2 (OMC Plant 2) site in Waukegan, Illinois. The investigation activities were conducted between November 16, 2004, and March 31, 2005, and included sediment probing in the North Ditch and South Ditch, the collection of unsaturated and saturated soils from beneath and outside the plant, and sampling to delineate the extent of dense nonaqueous-phase liquids (DNAPL).

This memorandum includes the following:

- Description of specific field activities performed, including locations, methods, and deviations from the site-specific plans
- A summary of the samples collected and requested analyses
- An evaluation of sediment volumes within the North and South Ditches
- Boring logs describing materials encountered at each location (included as Attachment 1)

Sediment Investigation

As described in the *Field Sampling Plan* (FSP; CH2M HILL, 2005), the sediment investigation was limited to probing the North and South Ditches to determine the volume of sediments.

Sediment probing was conducted by wading and probing to measure the width and thickness of sediments along transects spaced at 300-foot intervals in the North Ditch and South Ditch. The thickness of the soft sediment was determined by pushing a range pole equipped with a metal tip and steel shaft to refusal. Each of the transects included three measurements, one at each bank near the sediment/water interface and one at the approximate center of the ditch. The sediment thickness at each transect was recorded and the transect location was marked for surveying at a later date. A total of 11 transects, 9 in the North Ditch and 2 in the South Ditch, were investigated (Figure 1). The results of the sediment thickness measurements along each transect and the estimated sediment volume for the North and South Ditch are presented in Tables 1 and 2, respectively. The total sediment volumes were estimated to be 3,477 cubic yards in the North Ditch and 731 cubic yards in the South Ditch.

Soil Investigation

Data Collection Objectives

The soil investigation activities included soil boring and collection of unsaturated and saturated samples from beneath and outside of the building. The soil investigation was limited and focused to fill data gaps identified based on the results from previous investigations. The data collection objectives for different areas of the site are as follows:

- Determine the nature and extent of soil contamination, including carcinogenic polynuclear aromatic hydrocarbons (CPAHs) and polychlorinated biphenyls (PCBs) in the Former Die Cast Underground Storage Tank/Aboveground Storage Tank (UST/AST) area located east of building
- Collect soil samples from the vicinity of the PCB AST area and parking lot areas north of the building to evaluate direct-contact risk
- Collect soil samples from the vicinity of the grassy area on the south side of the building to confirm soils in the area do not pose a direct-contact risk
- Define nature and extent of soils potentially contaminated with DNAPL
- Determine contaminant concentrations in soil beneath the building at select groundwater investigation locations and correlate the membrane interface probes (MIPs) responses to soil concentrations
- Characterize the lithologic and geotechnical properties of site soils (e.g., grain size, bulk density, porosity, moisture content, total organic carbon, soil oxidant demand, etc.) that will be used in the evaluation of contaminant fate and transport, risk, and remedial alternatives

Sampling Procedures

The soil samples were collected using direct push methods by Innovative Probing Solutions (IPS) of Mt. Vernon, Illinois. Soil samples were continuously sampled using a Geoprobe® macrocore sampler with a disposable acetate liner. Sampling equipment was decontaminated in accordance with FOP-17, *Decontamination of Drilling Rigs and Equipment.* A photoionization detector (PID) and combustible gas indicator were used to monitor air quality during field activities for worker health and safety.

The soil samples were logged using the ASTM D-2487, Unified Soil Classification System and were screened for organic vapors using a PID. Observations during sampling activities, including PID readings, soil staining, odors, and sheen, were also noted on the soil boring logs. Boring location coordinates (northing and easting) were determined measuring the position from known survey locations with a measuring tape. The soil boring logs are included in Attachment 1.

A summary of the samples collected and the analysis performed is provided in Table 3. Samples analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, and metals were submitted to a laboratory in USEPA's Contract Laboratory Program (CLP). Soil samples to be analyzed for total organic carbon (TOC), geotechnical properties (e.g., porosity, bulk density, grain size, and moisture content), and soil oxidant demand (SOD) were sent to CT Laboratory of Baraboo, Wisconsin.

Deviations to the FSP relative to sample collection are as follows:

- Soil samples to be analyzed for VOCs were collected using En Core® samplers rather than 4-ounce jars with methanol preservation.
- Geotechnical samples were collected using Geoprobe® macrocore samplers utilizing direct-push technology rather than hollow-stem augers (HSAs) and split-spoon samplers. Based onsite geology, collecting samples using HSAs and split spoons would be problematic because of the potential for heaving sands.

Investigation Areas

Former Die Cast UST/AST Area

A total of 19 soil samples were collected from 10 soil borings (SO-035 through SO-044) in the Former Die Cast UST/AST area (Figure 2). Unsaturated soil samples were collected from the 0- to 6-inch interval and the 2-foot interval above the water table and submitted to a CLP laboratory to be analyzed for VOCs, SVOCs, and PCBs.

Soil samples were not collected from boring location SO-044 in the northeastern corner of the site because of the presence of engineered fill. The presence of engineered fill at this location may be related to the East Containment Cell that is reported to extend to the eastern fenceline.

PCB Area North of the Plant

A total of 74 soil samples were collected from 35 soil borings (SO-001 through SO-034) completed in the PCB AST area and parking lot areas north of the plant (Figure 2). Surface soil samples were collected from the 0- to 6-inch interval and the 2-foot interval above the water table, and submitted to a CLP laboratory to be analyzed for VOCs, SVOCs, and PCBs.

Grassy Area Surrounding Corporate Building

Twelve unsaturated soil samples were collected from 6 soil borings (SO-050 through SO-055) in the grassy area south of the plant and adjacent to the Corporate Building (Figure 2). Surface soil samples were collected from the 0- to 6-inch interval and the 2-foot interval above the water table, and submitted to a CLP laboratory to be analyzed for VOCs, SVOCs, and PCBs.

Groundwater Contamination Locations Beneath Plant 2

A total of 26 soil samples were collected from 8 soil borings (SO-067 through SO-071, and SO-080 through SO-082) completed beneath the building (Figure 3). The soil sample locations were selected based on the results from the MIP investigation.

The FSP specified that each boring would have analytical and geotechnical samples collected from three depth intervals: the 0- to 4-foot interval (estimated depth of unsaturated zone), the top of aquifer, and the bottom of aquifer. The analytical samples would be submitted to the CLP for VOC, SVOC, and PCB analyses. Soil samples for TOC, SOD, and geotechnical properties were submitted to CT Laboratory for analysis. The limited sample recovery and the presence of fill materials required the following adjustments to be made in the sampling approach:

- SO-067—The shallowest analytical and geotechnical samples were collected at depth intervals of 4.5 to 5.0 and 5.0 to 6.0 feet, respectively. The 0- to 4-foot interval was not sampled because of the presence of fill materials. The samples were collected as close to the native soils and water table (6 feet below ground surface [bgs]) as possible. In addition, the sample recovered from the bottom of the aquifer was insufficient to collect an analytical sample.

- SO-068—A geotechnical sample was not collected from the bottom of aquifer because of limited sample recovery. The analytical sample from the bottom of the aquifer was deemed more essential for site remedial objectives because of the presence of possible impacted materials based on olfactory evidence.

- SO-069—A geotechnical sample was not collected from 0 to 4 feet but from 4 to 5.5 feet, because of the presence of fill materials and to obtain a sample within the unsaturated zone just above the water table.

- SO-070—The analytical and geotechnical samples were collect from below 0 to 4 feet (3.3 to 4.5 feet bgs and 4.5 to 5.5 feet bgs) because of the presence of possible impacted materials, as indicated by elevated photoionization detector (PID) readings from samples just above the water table at 5.5 feet bgs.

- SO-071—The analytical sample was taken below 0 to 4 feet bgs because of the presence of fill to 1.1 feet bgs. The limited unsaturated native soil sample interval for analytical and geotechnical use influenced the decision to take the analytical sample from 4 to 5 feet bgs, still within the unsaturated zone of the aquifer.

- SO-081—The analytical sample was taken below 0 to 4 feet bgs because of the presence of fill to 4.0 feet bgs. The limited unsaturated native soil sample interval for analytical and geotechnical use influenced the decision to take the analytical sample from 4 to 4.9 feet bgs, within the unsaturated zone of the aquifer.

- SO-082—The analytical and geotechnical samples were collected below 0 to 4 feet bgs because of the presence of fill material and depth to water table of 6.1 feet. The samples were collected as close to the water table as possible within the unsaturated zone of the aquifer.

- Samples for geotechnical properties were collected from beneath the building at eight of the ten boring locations originally proposed in the FSP. A ninth location beneath the western portion of the plant was not completed because of utilities and subsurface obstructions at depth. The tenth location was eliminated based on the spatial coverage of the sampling conducted, and was utilized as an additional location outside the building.

Soil Sampling at New Monitoring Well Locations

Additional lithologic and geotechnical characterization were conducted by collecting unsaturated and saturated soil samples from borings conducted for the installation of new monitoring wells outside the building. Soil analytical samples were collected from 14 soil borings at new monitoring well locations (SO-061 through SO-066 and SO-072 through SO-079). At each new monitoring well location, three soil samples were collected—one each from the unsaturated zone, the top of the aquifer, and the bottom of the aquifer. These samples were collected from a direct-push Geoprobe® macrocore sampler and not hollow stem augers and split–spoon samplers specified in the FSP. Based onsite geology (i.e., heaving sands), the direct-push Geoprobe® macrocore sampler was more suited for sample collection. Soil samples were sent to the CLP to be analyzed for VOCs, SVOCs, and PCBs. The samples were also submitted to CT Laboratory to be analyzed for TOC, grain size, porosity, and bulk density to evaluate transport properties in the unsaturated zone and the groundwater flow and transport characteristics of the aquifer.

As discussed above, the FSP specified that each boring would have analytical and geotechnical samples collected from three depth intervals. The limited sample recovery and the presence of fill materials required the following adjustments to be made in the sampling approach.

- SO-062—Geotechnical samples were not collected from the 0- to 4-foot interval and top of aquifer because of limited sample recovery. Analytical samples were collected, with the limited sample recovered from 0- to 4-foot and top of aquifer intervals, as they were considered more essential for site remedial objectives.
- SO-064—Geotechnical samples were not collected because of visual evidence of contamination. The objective for this monitoring well was to provide an upgradient "background" location (originally planned offsite, northwest of the rail line). Because of visual evidence of contamination at SO-064, the monitoring well location was moved north to SO-065, where analytical and geotechnical samples were collected. The soil samples collected at SO-064 were submitted for VOCs, SVOCs, and PCBs.
- SO-073 was a soil boring for a new monitoring well, replacing monitoring well nested location W-2. The boring was simply logged and not sampled.
- SO-074 was to be analyzed for SOD, but the analysis was inadvertently omitted from the analyte list to the laboratory.
- SO-076 was a soil boring for a new monitoring well, replacing monitoring well nested location W-4. The boring was simply logged and not sampled.
- At SO-078, a geotechnical sample of the unsaturated zone was not collected as the water table was encountered at 0.6 foot bgs. This did not allow sufficient unsaturated sample to be collected for analysis of geotechnical properties by the laboratory (a minimum of 1 foot was required).

Selected Groundwater Investigation Locations

Ten soil analytical samples were collected from 10 soil borings at locations outside and beneath the building (Figure 4). The soil sample locations were selected based on evidence of contamination (e.g., visual, olfactory and MIP results) and to confirm (about 10 percent of locations) MIP results. Confirmation samples were collected to represent both low and high concentration areas to provide a baseline for future sampling and correlate the MIP's response to soil concentration. Samples were collected for VOCs and submitted to a CLP laboratory to be analyzed.

Initially, these soil samples were to be located just beneath the building to correlate the MIP's response to soil concentrations. During the MIPs investigation, it was decided that including locations outside the building would allow correlation over a larger concentration range. Soil borings at select groundwater contamination locations beneath the building were also strategically added, based on the MIP results.

DNAPL Investigation

Analytical results from previous investigations indicate TCE contamination greater than 10 µg/L within the Metal Working Area and areas outside the building near the northwestern portions of the site, and areas just south and west of the Corporate Building. Based on the amount of solvent used at the plant, it was suspected that areas containing TCE concentrations greater than 10 µg/L may include "free product" (i.e., DNAPL). Based on the previous investigation results, a potential DNAPL area was identified beneath the building. A MIP investigation was conducted to define the high TCE concentration areas. The MIP investigation is described in a separate technical memorandum.

Although the MIP investigation did not identify DNAPL beneath targeted areas of the plant, DNAPL was encountered at a location outside the plant. Two soil borings (SO-026 and SO-057) were completed in this area and four soil samples were collected and analyzed for VOCs, and/or SVOCs and PCBs (Figure 2 and Table 1).

Four additional direct-push offset locations within a 50-foot radius of SO-026 and SO-057 were completed to determine the presence of DNAPL (Figure 4). The borings were not logged but were advanced in the subsurface until boring refusal at the till boundary (assumed to be approximately 30.5 feet bgs based on SO-057 refusal). It was assumed the DNAPL would reside at the top of till boundary. A screen-point sampler was then exposed at a 5-foot interval just above the till boundary and groundwater was extracted to check for visual evidence of DNAPL. A foot-valve was also used to purge groundwater for evidence of DNAPL. There was no visual evidence of DNAPL at any of the offset locations.

Reference

CH2M HILL. 2004. *Field Sampling Plan, OMC Plant 2, Waukegan, Illinois, Final*. November.

TABLE 1
Summary of North Ditch Sediment Investigation
OMC Plant 2

North Ditch

Date	Transect	Location ID	Poling X	Poling Y	Water Depth (ft)	Probe Depth (ft)	Sediment Thickness (ft)	Native Clay Not Penetrated	Average Transect Sediment Thickness (ft)	Area Represented By Transect (sq ft)	Transect Volume Estimate (cu yards)	Comments
11/16/2005	ND-T1	ND-T1-A	1122583.280	2078567.010	3.7	6.7	3.0		2.7	2928.0	289.2	compact sand
11/16/2005	ND-T1	ND-T1-B	1122583.280	2078561.560	3.6	6.3	2.7					soft silt/sand/gravel
11/16/2005	ND-T1	ND-T1-C	1122583.280	2078556.600	2.5	4.8	2.3					sand
11/16/2005	ND-T2	ND-T2-A	1122865.910	2078566.500	2.1	3.6	1.5		1.8	5426.0	368.4	
11/16/2005	ND-T2	ND-T2-B	1122865.910	2078560.850	1.8	3.7	1.9					
11/16/2005	ND-T2	ND-T2-C	1122865.910	2078555.480	1.8	3.9	2.1					6" soft silt on top of sand
11/16/2005	ND-T3	ND-T3-A	1123165.900	2078566.360	1.8	6.9	5.1		4.1	5910.0	897.4	soft silt/sand/refusal
11/16/2005	ND-T3	ND-T3-B	1123165.900	2078560.280	1.7	6.3	4.6					soft silt/sand/refusal
11/16/2005	ND-T3	ND-T3-C	1123165.900	2078554.910	1.7	4.3	2.6					compact sand
11/16/2005	ND-T4	ND-T4-A	1123466.870	2078563.530	2.4	6.0	3.6		1.5	4795.0	260.5	soft silt/compact sand
11/16/2005	ND-T4	ND-T4-B	1123466.870	2078559.151	2.4	3.2	0.8					sand/gravel
11/16/2005	ND-T4	ND-T4-C	1123466.870	2078554.912	0.0	0.0	0.0					Rip rap
11/16/2005	ND-T5	ND-T5-A	1123766.850	2078560.560	2.8	6.3	3.5		1.9	3216.0	222.3	soft silt/sand/refusal
11/16/2005	ND-T5	ND-T5-B	1123766.850	2078557.310	2.4	4.5	2.1	**X**				soft silt/compact sand/ no refusal
11/16/2005	ND-T5	ND-T5-C	1123766.850	2078554.210	0.0	0.0	0.0					Rip rap
11/16/2005	ND-T6	ND-T6-A	1124067.400	2078558.730	2.7	5.4	2.7		1.3	3275.0	157.7	soft silt/sand/refusal
11/16/2005	ND-T6	ND-T6-B	1124067.400	2078555.620	2.4	3.6	1.2	**X**				soft silt/very dense sand/no refusal
11/16/2005	ND-T6	ND-T6-C	1124067.400	2078552.510	0.0	0.0	0.0					Rip rap
11/16/2005	ND-T7	ND-T7-A	1124426.710	2078561.300	0.9	2.8	1.9	**X**	2.3	7156.0	600.8	sand/very dense sand/no refusal
11/16/2005	ND-T7	ND-T7-B	1124419.100	2078553.810	1.2	3.1	1.9	**X**				soft silt/very dense sand/no refusal
11/16/2005	ND-T7	ND-T7-C	1124412.090	2078546.680	0.7	3.7	3.0	**X**				soft/sand lense/sand/no refusal
11/16/2005	ND-T8	ND-T8-A	1124560.790	2078354.655	1.4	2.7	1.3		1.4	7334.0	389.3	soft silt/compact sand/refusal?
11/16/2005	ND-T8	ND-T8-B	1124552.485	2078350.125	1.4	2.9	1.5					soft silt/compact sand/refusal?
11/16/2005	ND-T8	ND-T8-C	1124544.410	2078345.721	1.4	2.9	1.5					soft silt/compact sand/refusal?
11/16/2005	ND-T9	ND-T9-A	1124662.158	2078169.280	1.5	2.8	1.3		1.1	6947.0	291.6	soft silt/dense sand/refusal
11/16/2005	ND-T9	ND-T9-B	1124654.299	2078164.104	1.5	2.8	1.3					soft silt/dense sand/refusal
11/16/2005	ND-T9	ND-T9-C	1124647.092	2078159.480	1.3	2.1	0.8					soft silt/compact sand/refusal
											3477.2	**Total Volume (cubic yards)**

Notes:
a. "ft" = feet
b. "sq ft" = square feet
c. "cu yards" = cubic yards
d. **'X'** in "no native clay penetrated" column denotes that manually driven sediment pole reached refusal (compact sands, etc.) but did not reach native clay interface.
e. Transect locations were determined using survey coordinates and aerial photograph reference. ND-T8 and ND-T9 were located using an aerial photograph only.
f. Transect ND-T7's surveyed location did not correlate with field records and therefore was not used. Location was located using an aerial photo.

TABLE 2
Summary of South Ditch Sediment Investigation
OMC Plant 2

South Ditch

Date	Transect	Location ID	Poling X	Poling Y	Water Depth (ft)	Probe Depth (ft)	Sediment Thickness (ft)	Native clay not penetrated	Probe Depth (ft)	Average Transect Sediment Thickness (ft)	Area Represented By Transect (sq ft)	Transect Volume Estimate (cu yards)	Comments
11/16/2005	SD-T1	SD-T1-A	1124011.19	2077279.5	0.6	4.6	4.0		4.6	4.6	1955.0	335.5	mostly soft silt/sand
11/16/2005	SD-T1	SD-T1-B	1124008.18	2077267.43	1.4	3.8	2.4	**X**	3.8				soft silt/compact sand/no refusal
11/16/2005	SD-T1	SD-T1-C	1124005.59	2077256.88	0.8	5.5	4.7		5.5				mostly soft silt/sand/refusal?
11/16/2005	SD-T2	SD-T2-A	1124067.65	2077270.23	0.6	5.4	4.8		5.4	5.7	1883.0	395.2	mostly soft silt/sand/refusal
11/16/2005	SD-T2	SD-T2-B	1124067.65	2077260.75	0.8	5.6	4.8		5.6				mostly soft silt/sand/refusal?
11/16/2005	SD-T2	SD-T2-C	1124067.65	2077252.35	1.1	6.0	4.9		6.0				mostly soft silt/sand/refusal?
												730.7	**Total volume (cu yards)**

Notes:
a. "ft" = feet
b. "sq ft" = square feet
c. "cu yards" = cubic yards
d. **'X'** in "no native clay penetrated" column denotes that manually driven sediment pole reached refusal (compact sands, etc.) but did not reach native clay interface.
e. Transect locations were determined using survey coordinates and aerial photograph reference. Transect SD-T2 was located using an aerial photograph only.

TABLE 3
Soil Investigation Sample Summary
OMC Plant 2

Location Identifier	Location Type	Date Logged/Sampled	Analytical Sample Intervals (ft bgs)	Geotechnical Sample Intervals (ft bgs)	Analyses							MIP Location
					VOCs	PAHs/ SVOCs	Pesticides/PCBs	TAL Metals/ Cyanide	TOC	SOD	Geotech	
Former Die Cast UST/AST Area												
SO-035	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					
		02/08/2005	1.0 - 2.0		X	X	X					
SO-036	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					MIP-062
		02/08/2005	1.0 - 2.0		X	X	X					
SO-037	Soil Boring	02/09/2005	0.0 - 0.5		X	X	X					
		02/09/2005	1.0 - 2.0		X	X	X					
SO-038	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					
		02/08/2005	1.0 - 2.0		X	X	X					
SO-039	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					
		02/08/2005	0.6 - 1.3		X	X	X					
SO-040	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					
		02/08/2005	1.5 - 2.0		X	X	X					
SO-041	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					MIP-040
		02/08/2005	1.4 - 2.4		X	X	X					
SO-042	Soil Boring	02/08/2005	0.0 - 0.5		X	X	X					
		02/08/2005	1.5 - 2.5		X	X	X					
SO-043	Soil Boring	02/09/2005	0.0 - 0.5		X	X	X					
		02/09/2005	2.8 - 3.0		X	X	X					
SO-044	Soil Boring	2/9/2005	NA									
SO-066	Soil Boring	03/16/2005	0.5 - 1.0	1.0 - 2.0					X		X	MIP-040
		03/16/2005	4.5 - 5.5	5.0 - 6.5					X		X	
		03/16/2005	28.0 - 29.0	29.0 - 30.0					X		X	
SO-073	Soil Boring	3/23/2005	NA									
PCB AST Area and Parking Lot Areas North of the OMC Plant 2												
SO-001	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	0.7 - 1.6		X	X	X					
SO-002	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	0.5 - 1.3		X	X	X					
SO-003	Soil Boring	01/31/2005	0.0 - 0.5		X	X	X					
		01/31/2005	1.5 - 2.0		X	X	X					
SO-004	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	0.6 - 1.4		X	X	X					
SO-005	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	2.0 - 2.5		X	X	X					
SO-006	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					
		02/07/2005	0.7 - 0.8		X	X	X					
SO-007	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					
		02/07/2005	0.7 - 1.4		X	X	X					
SO-008	Soil Boring	01/31/2005	0.0 - 0.5		X	X	X					
		01/31/2005	1.5 - 2.5		X	X	X					
SO-009	Soil Boring	01/31/2005	0.0 - 0.5		X	X	X					
		01/31/2005	1.5 - 2.5		X	X	X					
SO-010	Soil Boring	01/31/2005	0.0 - 0.5		X	X	X					
		01/31/2005	1.5 - 2.5		X	X	X					
SO-011	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					
		02/07/2005	1.2 - 1.9		X	X	X					

TABLE 3
Soil Investigation Sample Summary
OMC Plant 2

Location Identifier	Location Type	Date Logged/Sampled	Analytical Sample Intervals (ft bgs)	Geotechnical Sample Intervals (ft bgs)	Analyses							MIP Location
					VOCs	PAHs/ SVOCs	Pesticides/PCBs	TAL Metals/ Cyanide	TOC	SOD	Geotech	
SO-012	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					
		02/07/2005	1.6 - 2.6		X	X	X					
SO-013	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					MIP-005
		02/07/2005	1.4 - 1.9		X	X	X					
SO-014	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-006
		02/17/2005	1.5 - 2.0		X	X	X					
SO-015	Soil Boring	02/09/2005	0.3 - 0.8		X	X	X					
		02/09/2005	0.8 - 1.2		X	X	X					
SO-016	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-008
		02/17/2005	1.5 - 2.0		X	X	X					
SO-017	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-009
		02/17/2005	1.4 - 2.0		X	X	X					
SO-018	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-011
		02/17/2005	2.8 - 3.3		X	X	X					
SO-019	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-012
		02/17/2005	1.5 - 2.5		X	X	X					
SO-020	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					MIP-089
		02/01/2005	0.5 - 1.5		X	X	X					
SO-021	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					MIP-090
		02/01/2005	1.0 - 2.0		X	X	X					
SO-022	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					
		02/01/2005	1.0 - 2.0		X	X	X					
SO-023	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					
		02/01/2005	1.5 - 2.5		X	X	X					
SO-024	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					MIP-091
		02/01/2005	1.5 - 2.5		X	X	X					
SO-025	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	2.2 - 2.5		X	X	X					
SO-026	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					MIP-027
		02/07/2005	1.0 - 2.0		X	X	X					
SO-027	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					
		02/01/2005	1.0 - 2.0		X	X	X					
SO-028	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					
		02/01/2005	1.5 - 2.5		X	X	X					
SO-029	Soil Boring	02/01/2005	0.0 - 0.5		X	X	X					
		02/01/2005	1.5 - 2.5		X	X	X					
SO-030	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					
		02/17/2005	2.0 - 3.0		X	X	X					
SO-031	Soil Boring	02/07/2005	0.0 - 0.5		X	X	X					MIP-036
		02/07/2005	1.5 - 2.5		X	X	X					
SO-032	Soil Boring	02/09/2005	0.0 - 0.5		X	X	X					
		02/09/2005	1.4 - 1.6		X	X	X					
SO-033	Soil Boring	02/09/2005	0.0 - 0.5		X	X	X					
		02/09/2005	2.4 - 2.6		X	X	X					
SO-034	Soil Boring	02/09/2005	0.0 - 0.5		X	X	X					
		02/09/2005	2.0 - 3.0		X	X	X					
SO-045	Soil Boring	02/02/2005	0.0 - 0.5		X	X	X					
		02/02/2005	1.5 - 2.5		X	X	X					

TABLE 3
Soil Investigation Sample Summary
OMC Plant 2

Location Identifier	Location Type	Date Logged/Sampled	Analytical Sample Intervals (ft bgs)	Geotechnical Sample Intervals (ft bgs)	Analyses: VOCs	PAHs/ SVOCs	Pesticides/PCBs	TAL Metals/ Cyanide	TOC	SOD	Geotech	MIP Location
SO-057	Soil Boring	2/23/2005	2.0 - 3.0		X							MIP-027
SO-059	Soil Boring	3/1/2005	0.0 - 1.0		X							MIP-012
SO-061	Soil Boring	03/14/2005	1.6 - 2.3	1.3 - 2.3					X		X	MIP-036
		03/14/2005	6.0 - 8.0	4.0 - 6.0					X		X	
		03/15/2005	24.0 - 24.5	24.5 - 26.5					X		X	
SO-062	Soil Boring	03/15/2005	0.8 - 2.3	NA	X	X	X		X	X		MIP-001
		03/15/2005	4.0 - 5.5	NA	X	X	X		X	X		
		03/15/2005	22.0 - 24.6	20.5 - 22.0	X	X	X		X	X	X	
SO-063	Soil Boring	03/15/2005	2.5 - 3.4	1.5 - 2.5					X		X	MIP-006
		03/15/2005	7.5 - 8.0	6.5 - 7.5					X		X	
		03/15/2005	22.0 - 22.5	20.5 - 22.0					X		X	
SO-076	Soil Boring	3/25/2005	NA									
Grassy Area on the south side of the building												
SO-050	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					
		02/17/2005	1.0 - 1.8		X	X	X					
SO-051	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-054
		02/17/2005	1.4 - 3.0		X	X	X					
SO-052	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-059
		02/17/2005	0.5 - 1.3		X	X	X					
SO-053	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					MIP-053
		02/17/2005	2.3 - 3.8		X	X	X					
SO-054	Soil Boring	02/17/2005	0.0 - 0.5		X	X	X					
		02/17/2005	0.6 - 2.7		X	X	X					
SO-055	Soil Boring	2/22/2005	4.0 - 5.0		X							MIP-053
SO-075	Soil Boring	03/24/2005	2.4 - 2.8	2.4 - 3.3					X		X	
		03/24/2005	5.4 - 5.9	5.9 - 6.9					X		X	
		03/24/2005	22.4 - 22.9	24.0 - 24.8					X		X	
SO-079	Soil Boring	03/29/2005	1.4 - 2.7	1.6 - 2.6	X	X	X		X	X	X	MIP-059
		03/29/2005	2.7 - 3.6	4.5 - 6.0	X	X	X		X	X	X	
		03/29/2005	24.0 - 24.9	20.6 - 21.6	X	X	X		X	X	X	
Beneath OMC Plant 2 building												
SO-047	Soil Boring	2/10/2005	1.0 - 2.0		X							MIP-021
SO-048	Soil Boring	2/11/2005	1.7 - 2.7		X							MIP-026
SO-049	Soil Boring	2/11/2005	1.0 - 2.4		X							MIP-015
SO-056	Soil Boring	2/22/2005	1.7 - 2.0		X							MIP-046
SO-058	Soil Boring	3/1/2005	1.1 - 1.7		X							MIP-032
SO-067	Soil Boring	03/17/2005	4.5 - 5.5	5.0 - 6.0	X	X	X		X	X	X	MIP-021
		03/17/2005	6.0 - 6.5	6.5 - 7.5	X	X	X		X	X	X	
				28.0 - 28.8							X	
SO-068	Soil Boring	03/21/2005	2.5 - 3.4	1.0 - 2.5					X		X	
		03/21/2005	5.0 - 5.5	5.5 - 6.5					X		X	
		03/21/2005	28.0 - 28.6	NA					X			
SO-069	Soil Boring	03/21/2005	0.0 - 1.7	4.0 - 5.5	X	X	X		X	X	X	MIP-043
		03/21/2005	8.0 - 10.4	5.5 - 6.5	X	X	X		X	X	X	
		03/21/2005	24.0 - 25.5	26.5 - 27.5	X	X	X		X	X	X	

TABLE 3
Soil Investigation Sample Summary
OMC Plant 2

Location Identifier	Location Type	Date Logged/Sampled	Analytical Sample Intervals (ft bgs)	Geotechnical Sample Intervals (ft bgs)	Analyses: VOCs	PAHs/ SVOCs	Pesticides/PCBs	TAL Metals/ Cyanide	TOC	SOD	Geotech	MIP Location
SO-070	Soil Boring	03/22/2005	3.3 - 4.5	4.5 - 5.6	X	X	X		X	X	X	
		03/22/2005	9.5 - 10.5	8.0 - 9.5	X	X	X		X	X	X	
		03/22/2005	28.0 - 28.9	28.9 - 29.9	X	X	X		X	X	X	
SO-071	Soil Boring	03/22/2005	4.0 - 5.0	2.4 - 3.4	X	X	X		X	X	X	
		03/22/2005	9.3 - 10.3	8.3 - 9.3	X	X	X		X	X	X	
		03/22/2005	25.0 - 26.1	24.0 - 25.0	X	X	X		X	X	X	
SO-080	Soil Boring	03/30/2005	2.5 - 2.9	1.0 - 2.5					X		X	
		03/30/2005	5.8 - 7.1	8.0 - 9.7					X		X	
		03/30/2005	28.0 - 29.0	29.0 - 30.4					X		X	
SO-081	Soil Boring	03/30/2005	4.0 - 4.9	0.3 - 1.4	X	X	X		X	X	X	
		03/30/2005	8.0 - 8.7	9.9 - 10.9	X	X	X		X	X	X	MIP-085
		03/31/2005	25.0 - 26.9	24.0 - 25.0	X	X	X		X	X	X	
SO-082	Soil Boring	03/30/2005	4.0 - 5.0	5.0 - 6.0	X	X	X		X	X	X	
		03/30/2005	8.0 - 8.7	8.7 - 9.7	X	X	X		X	X	X	MIP-029
		03/31/2005	17.3 - 18.7	16.0 - 17.3	X	X	X		X	X	X	
Geotechnical Properties Outside OMC Plant 2 building												
SO-061	Soil Boring	03/14/2005	1.6 - 2.3	1.3 - 2.3					X		X	
		03/14/2005	6.0 - 8.0	4.0 - 6.0					X		X	MIP-036
		03/15/2005	24.0 - 24.5	24.5 - 26.5					X		X	
SO-062	Soil Boring	03/15/2005	0.8 - 2.3	NA	X	X	X		X	X		
		03/15/2005	4.0 - 5.0	NA	X	X	X		X	X		MIP-001
		03/15/2005	22.0 - 24.6	20.5 - 22.0	X	X	X		X	X	X	
SO-063	Soil Boring	03/15/2005	2.5 - 3.4	1.5 - 2.5					X		X	
		03/15/2005	7.5 - 8.0	6.5 - 7.5					X		X	MIP-006
		03/15/2005	22.0 - 22.5	20.5 - 22.0					X		X	
SO-064	Soil Boring	03/16/2005	0.0 - 1.0		X	X	X					
		03/16/2005	4.0 - 6.6		X	X	X					MIP-041
		03/16/2005	16.0 - 17.2		X	X	X					
SO-065	Soil Boring	03/16/2005	1.9 - 2.7	0.9 - 1.9					X		X	
		03/16/2005	6.0 - 6.4	6.4 - 7.4					X		X	
		03/16/2005	19.5 - 20.0	20.0 - 21.0					X		X	
SO-066	Soil Boring	03/16/2005	0.5 - 1.0	1.0 - 2.0					X		X	
		03/16/2005	4.5 - 5.5	5.0 - 6.5					X		X	MIP-040
		03/16/2005	28.0 - 29.0	29.0 - 30.0					X		X	
SO-072	Soil Boring	03/23/2005	2.0 - 2.8	1.0 - 2.0					X		X	
		03/23/2005	4.0 - 5.0	5.0 - 6.0					X		X	
		03/23/2005	24.0 - 24.4	24.4 - 25.4					X		X	
SO-074	Soil Boring	03/24/2005	0.4 - 0.8	0.5 - 1.5	X	X	X		X		X	
		03/24/2005	2.1 - 2.4	2.5 - 3.5	X	X	X		X		X	MIP-070
		03/24/2005	22.0 - 22.9	24.1 - 25.1	X	X	X		X		X	
SO-075	Soil Boring	03/24/2005	2.4 - 2.8	2.4 - 3.3					X		X	
		03/24/2005	5.4 - 5.9	5.9 - 6.9					X		X	
		03/24/2005	22.4 - 22.9	24.0 - 24.8					X		X	
SO-077	Soil Boring	03/28/2005	2.6 - 2.8	1.6 - 2.6					X		X	
		03/28/2005	4.0 - 6.0	8.5 - 10.0					X		X	MIP-065
		03/28/2005	24.0 - 24.3	24.3 - 25.3					X		X	

TABLE 3
Soil Investigation Sample Summary
OMC Plant 2

Location Identifier	Location Type	Date Logged/Sampled	Analytical Sample Intervals (ft bgs)	Geotechnical Sample Intervals (ft bgs)	Analyses							MIP Location
					VOCs	PAHs/ SVOCs	Pesticides/PCBs	TAL Metals/ Cyanide	TOC	SOD	Geotech	
SO-078	Soil Boring	03/29/2005	0.0 - 0.6	NA					X			
		03/29/2005	2.5 - 3.1	1.5 - 2.5					X		X	
		03/29/2005	20.0 - 20.7	16.1 - 17.1					X		X	
SO-079	Soil Boring	03/29/2005	1.4 - 2.7	1.6 - 2.6	X	X	X		X	X	X	
		03/29/2005	2.7 - 3.6	4.5 - 6.0	X	X	X		X	X	X	MIP-059
		03/29/2005	24.0 - 24.9	20.6 - 21.6	X	X	X		X	X	X	
Additional Soil Sampling Locations												
SO-046	Soil Boring	2/10/2005	1.2 - 2.2		X			X				MIP-028
SO-060	Soil Boring	3/1/2005	1.5 - 2.0		X							MIP-050

Notes:
a. "bgs" represents "below ground surface".
b. "VOCs" represents "Volatile Organic Compounds".
c. "PAH" represents "Polynuclear Aromatic Hydrocarbons".
d. "SVOCs" represents "Semi-Volatile Organic Compounds".
e. "PCBs" represents "Polychlorinated Biphenyls".
f. "TOC" represents "Total Organic Carbon".
g. "SOD" represents "Soil Oxidant Demand".
h. "MIP" represents "Membrane Interface Probe".
i. "NA" represents "Not Available".
j. VOC, PAH, SVOC, Pesticide, PCB, Lead and Metals analyses completed by USEPA's Contract Laboratory Program.
k. Cyanide, TOC, SOD, and Geotechnical analyses completed by CT Laboratories of Baraboo, WI.
l. Geotechnical analyses include: Porosity, Bulk Density, Grain Size, and Moisture Content.
m. Refer to *Quality Assurance Project Plan, OMC Plant 2* (January 2005) for specific analytical test methods used.

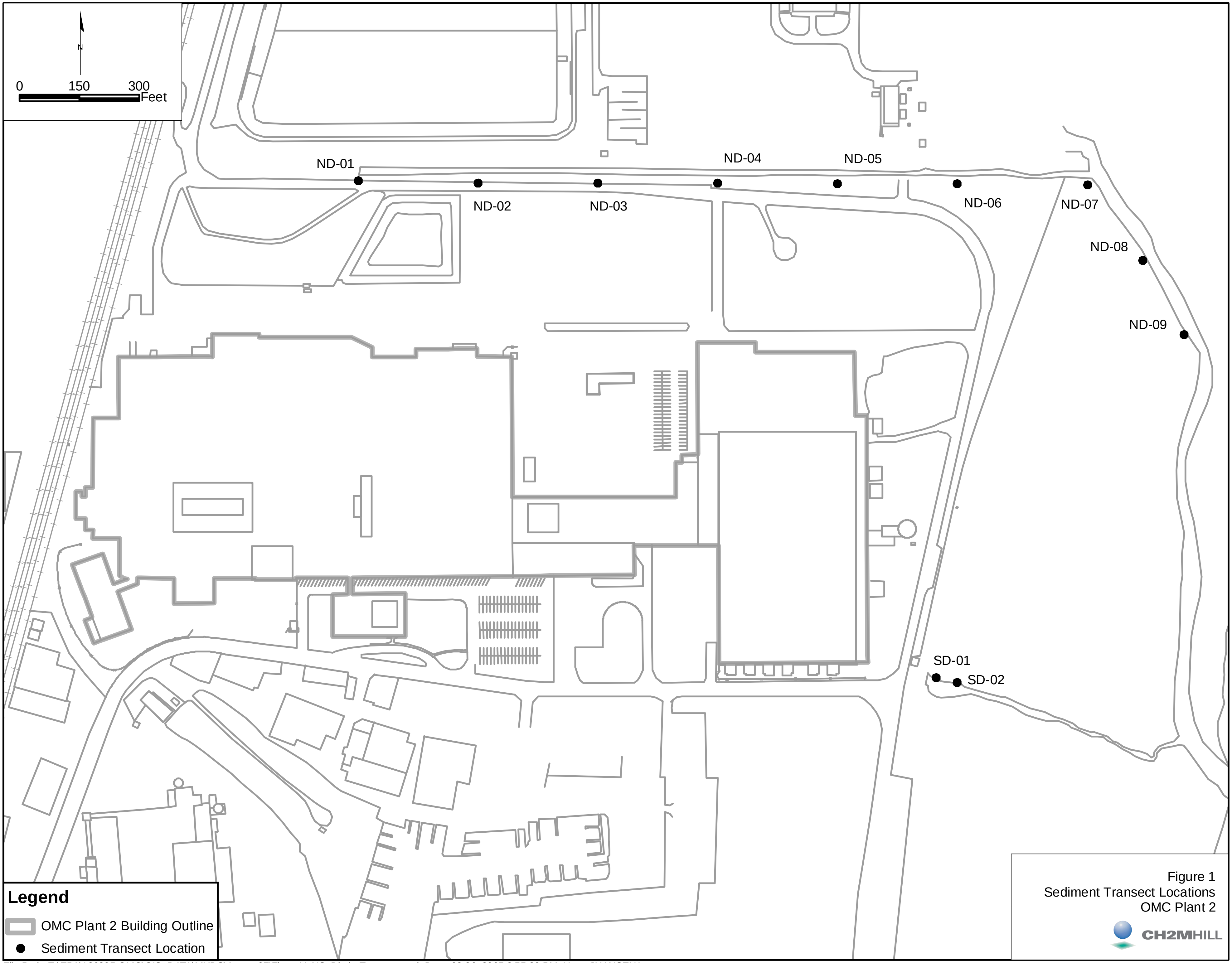


Figure 1
Sediment Transect Locations
OMC Plant 2

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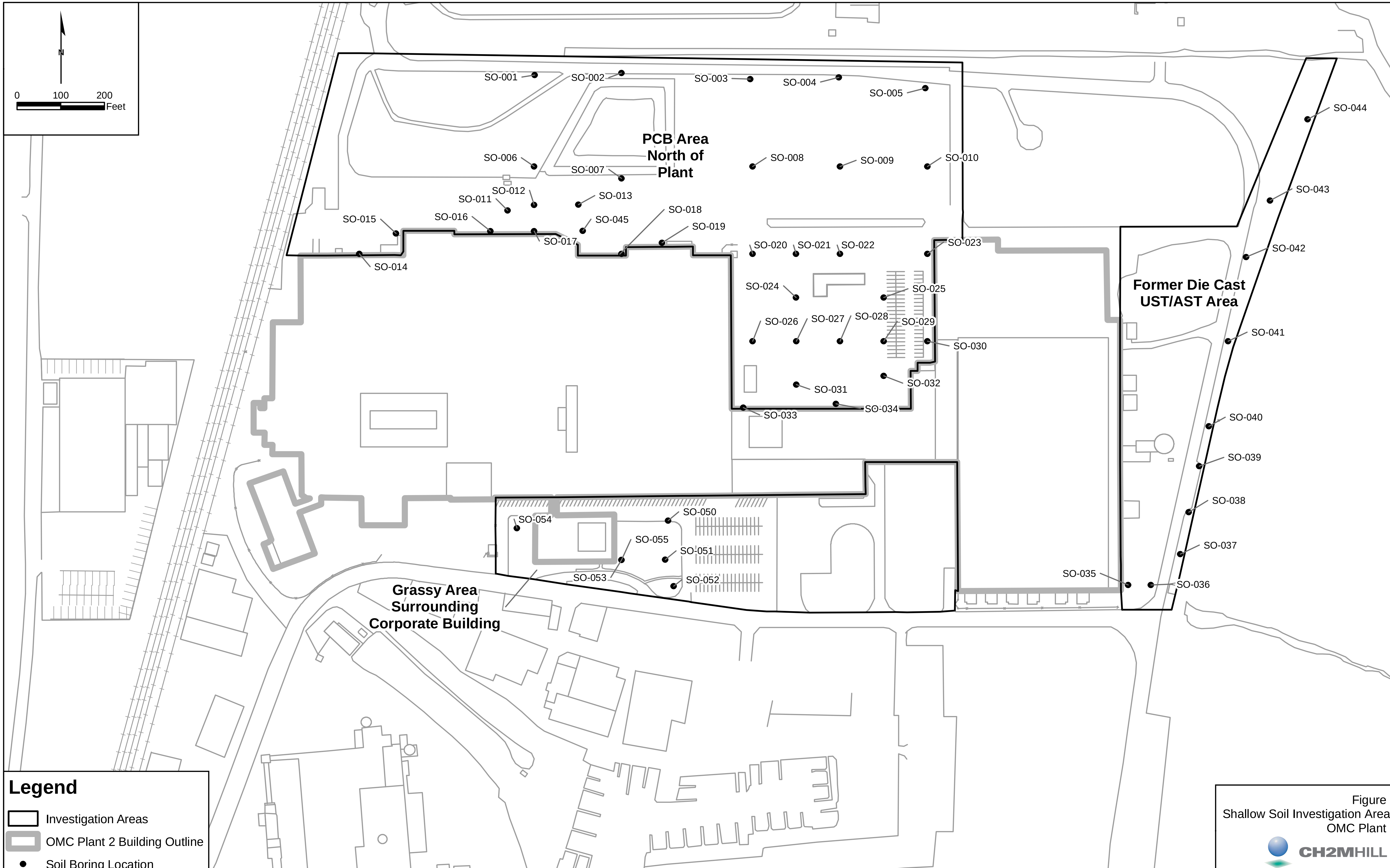

Figure 2
Shallow Soil Investigation Areas
OMC Plant 2

CH2MHILL

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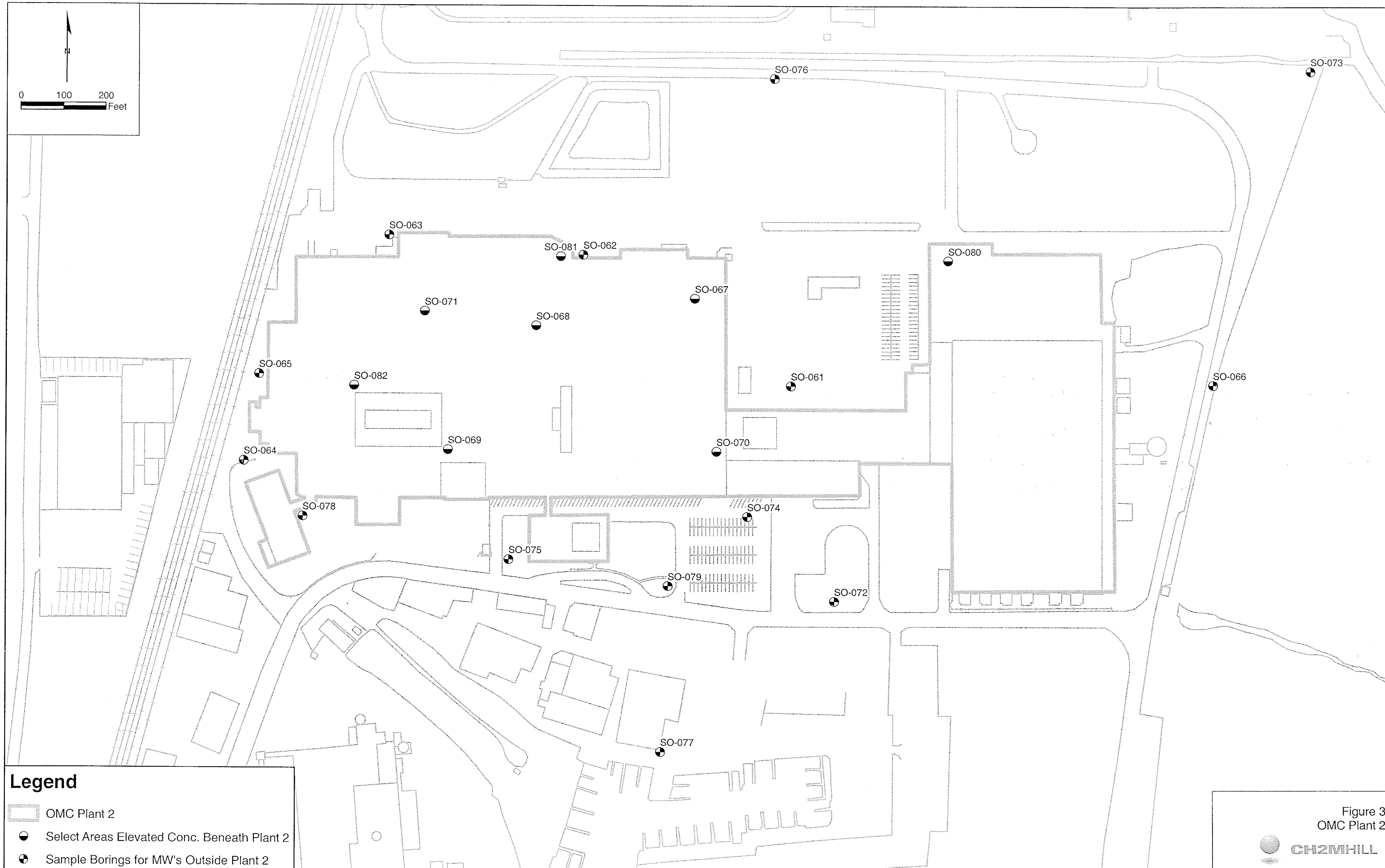

Figure 3
OMC Plant 2

CH2MHILL

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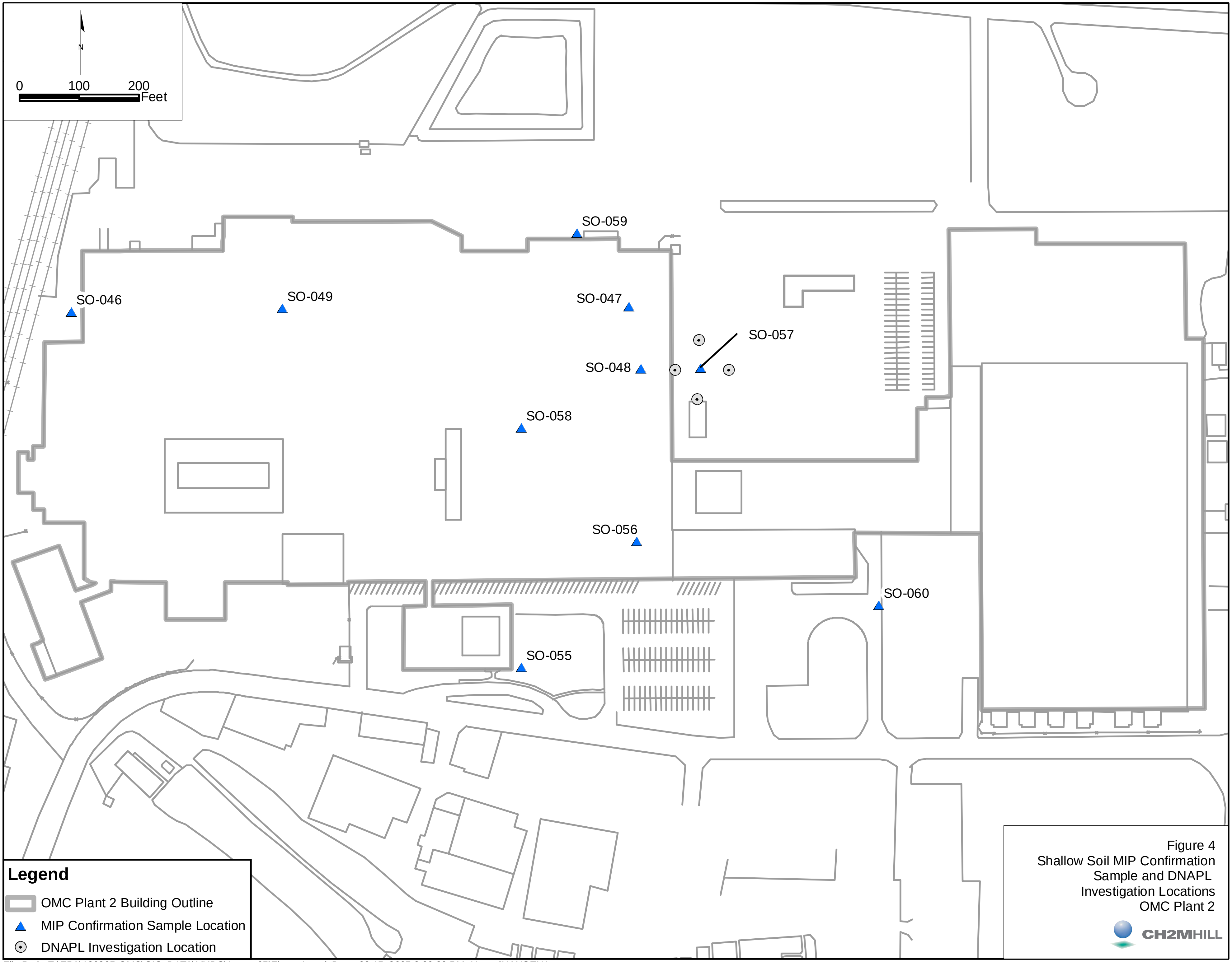

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Attachment 1

Soil Boring Logs
OMC Plant 2—Geological Investigations

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-001	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.4/4		Silty clay, CL, dark brown, damp, stiff, (fill)	PID = 0.0 ppm Collect soil sample from 0-0.5' bgs
	0.4-0.7				Sand, fine-grained, SP, damp, light brown	PID = 0.1 ppm
1	0.7-1.6				Silty, sandy, clay, CL, dark brown to brown, damp to moist, stiff; some gravels, "glassy" surfaces, possibly coal	PID = 8.6 ppm Collect soil sample from 0.7-1.6' bgs
2	1.6-4				Sand, medium to coarse-grained, SP, light brown, moist to wet at 2.7' bgs	PID = 0.0 ppm ∇ water table @ 2.7' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-002	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.1' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		3.6/4		Asphalt, silty sandy clay and gravel fill, HF, dark brown, damp, possible slag, loose	Collect soil sample from 0-0.5' bgs PID = 3.1 Collect soil sample from 0.5-1.3' bgs
1	1-1.3				Sandy clay, CL, orange-brown, moist, loose (fill)	PID = 0.0
	1.3-1.7				Silty clay, CL, light tan, dry stiff, occasional gravel (possible fill)	PID = 0.0
2	1.7-3.3				Sand, fine to medium, SP, light brown, moist to wet at 3.1' bgs	
3						PID = 0.0 ∇ water table @ 3.1' bgs
	3.3-4				Sand and gravel, SP, grey/brown, wet	
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-003	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.5' START: 1/31/05 FINISH: 1/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.6/4		Asphalt and gravel fill, HF, dark brown, damp	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	0.4-1				Silty clay and gravel fill, HP, light brown, dry	
1	1-6.4				Sand, medium to fine, SP, light brown with black bedding, moist to wet at ~ 2.5' bgs	Collect soil sample from 1.5-2' bgs
2		1				
						∇ ~ 2.5' bgs
3						
4						
			3.3/4			
5						
6		2				
	6.4-7				Sand and gravel, SP/GP, brown to light brown, wet	
7	7-8				Sand, fine-grained, SP, light brown to tan, wet	
8					EOB @ 8' bgs	
10						
15						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-004	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Access Road Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6				Silty sand and gravel fill, HF, dark brown, damp, loose	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	0.6-1.4				Silty sandy clay, CL, dark brown, damp, stiff (fill)	Collect soil sample from 0.6-1.4' bgs
1						
	1.4-4				Sand and gravel, SP, light brown, damp to wet; mostly medium-grained sand; wet at 2.9' bgs	
2						
						∇ water table @ 2.9' bgs
3						
4					EOB @ ~ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-005	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Access Road Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.8/4		Asphalt, silty sand and gravel fill, HF, dark brown, damp	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
1	0.6-1.4				Silty clay, CL, orange-brown, dry, stuff (fill)	
	1.4-2				Silty, sandy clay, CL, orange-brown, soft, moist (fill?)	
2	2-4				Sand and gravel, SP, light tan to brown, moist to wet at 2.8' bgs	Collect soil sample from 2-2.5' bgs
3						∇ water table @ 2.8' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-006	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: East of West Containment Cell
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.3/4		Silty clay fill, HF, dark brown, moist, stiff	collect soil sample from 0-0.5' bgs PID not working
1	0.7-1.9				Sand, SP, light brown to brown, damp, loose	Possible liner encountered for containment cell Collect soil sample from 0.7-1.9' bgs
2	1.9-4				Sand and gravel, SP, brown, moist to wet at 2.5' bgs	∇ water table @ 2.5' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-007	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS | LOCATION: East of Retention Pond
ELEVATION: | DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' bgs | START: 2/7/05 | FINISH: 2/7/05 | LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.8/4		Asphalt, silty sand and gravel, HF, dark brown to black, moist	Collect soil sample from 0-0.5' bgs PID = 0.0
1	0.7-1.4				Silty, sandy clay and gravel, till, HF, brown, moist, loose, fill	Collect soil sample from 0.7-1.4' bgs
2	1.4-4				Sand, SP, light brown to tan, moist to wet at 2.9' bgs; some black laminations from 2.6' to ~3' bgs	
3						∇ water table @ 2.9' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-008	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 1/31/05 FINISH: 1/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		3.5/4		Sand and gravel fill, HF, dark brown, damp	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	1-1.5				Silty clay and gravel fill, HF, light brown, dry, stiff	
	1.5-2.5				Sand, medium to fine-grained SP, light brown, damp	Collect soil sample from 1.5-2.5' bgs
	2.5-4				Sand and gravel, SP, brown, damp to wet at 3' bgs	∇ ~ 3' bgs
					EOB @ 4' bgs	
5						
15						
20						
25						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-009	SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' START: 1/31/05 FINISH: 1/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5				Sand and gravel fill, HF, dark brown, moist to damp	Collect soil sample from 0-0.5' PID = 0.0 ppm
1	0.5-1.5		3.7/4		Silty, sandy clay and gravel fill, HF, light brown, dry	
2	1.5-3.4				Sand, coarse to medium, SP, light brown, damp to moist	Collect soil sample from 1.5-2.5'
3						∇ water table @ 3.4' bgs
4	3.4-4				Sand, medium to fine, SP, light brown, wet EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-010	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' START: 1/31/05 FINISH: 1/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.6/4		Sand and gravel fill, HF, dark brown, moist to damp	Collect soil sample from 0-0.5' PID = 0.0 ppm
1	0.5-1.5				Silty clay with sand and gravel fill, HF, brown to tan, dry, stiff	
2	1.5-2.5				Sand, medium to fine, SP, dark brown to brown, damp	Collect soil sample from 1.5-2.5'
3	2.5-4				Sand, medium, SP, light brown, moist to wet at 2.9' bgs	∇ ~ 2.9' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-011	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of West Containment Cell
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.7' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.2		3.7/4		Asphalt, silt, sand and gravel fill, dark brown/black/dry, loose	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
1	1.2-1.9				Silty clay and gravel fill, light grey/pink, damp, loose	Collect soil sample from 1.2-1.9' bgs
2	1.9-4				Sand and gravel, SP, brown to tan, moist to wet at 2.7' bgs	
3						*Engineered fill encountered in offset boring at ~ 3-4' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-012	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Former TCE Tank Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.8/4		Silty sand and gravel fill, asphalt, dark brown to black, damp	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
1	0.6-1.6				Silty sandy clay and gravel fill, HF, light brown, damp, stiff	Collect soil sample from 1.6-2.6' bgs
2	1.6-4				Sand, medium-grained, SP, some random gravel, brown to tan, moist to wet ~ 3' bgs	
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-013	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of Retention Pond
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~3' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.3/4		Asphalt, sand and gravel fill, HF, light brown to black, damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.5-1.2				Silty clay and gravel fill, HF, tan to orange-brown, damp, stiff	
	1.2-1.4				Sand, SP, light brown, damp	
	1.4-1.9				Sandy clay, CL, black mottling, damp	Collect soil sample from 1.4-1.9' bgs
2	1.9-4				Sand, SP, medium-grained, light brown, some iron mottling, moist to wet at 3' bgs	
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-014	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of North Loading Dock
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: No water table encountered START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		2.9/4		Silty sandy clay and gravel fill, HF, light grey to brown, damp, stiff	Concrete 0-3" had staining Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	0.7-0.9				Wood	
1	0.9-4				Silty sandy clay and gravel fill, HF, brown to black (possible staining), some glass, damp, medium to soft	PID = 2.8 ppm Staining at ~ 1.5 to 2.9' bgs, petroleum odor Collect soil sample from 1.5-2' bgs
2						
3						
4					EOB @ 4' bgs	
5						
10						
15						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-015	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: On Concrete Slab near North Loading Dock
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3				Concrete pad	Collect soil sample from 0.3-0.8' bgs
	0.3-1.2		3.8/4		Silty sandy clay and gravel fill, HF, orange-brown, some red streaks (clay bricks), damp, stiff and loose	Collect soil sample from 0.8-1.2' bgs
1						Red streaks at 0.9' bgs
	1.2-2.1				Sand and gravel fill, HF, fine to coarse-grained, brown, moist	
2						
	2.1-2.3				Sand, coarse, SP, brown with some black sand grains, moist	∇ water table @ ~ 2.5' bgs
	2.3-4				Sand, fine to medium, SP, trace coal, brown/grey to grey, moist to wet at ~ 2.5' bgs	
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-016	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: Near North locker Room Outside
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs   START: 2/17/05   FINISH: 2/17/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		2.8/4		Silty sandy clay and gravel fill, HF, light brown, frozen	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	1-4				Silty sand and gravel fill, HF, brown to black (~ 1.5' bgs), damp to wet ~ 2.7' bgs	
2						Collect soil sample from 1.5-2' bgs Possible staining "black" at ~ 1.5' bgs
3						∇ water table @ ~ 2.7' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-017	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Outside Near Former Vapor Degreaser
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.4/4		Silty sandy clay and gravel, HF, dark brown, dry, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.5-1.4				Clayey sand and gravel, HF, orange-brown, damp to moist at ~ 1.2' bgs	
	1.4-4				Sand fill, HF, brown to tan-brown, moist to wet at ~ 3' bgs, loose (random slag)	Possible black staining at 1.4-2' bgs Collect soil sample from 1.4-2' bgs
2						
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-018	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Former Union Trailer
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: No water table encountered START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.3/4		Asphalt, silty clay and gravel fill, HF, dark brown/black to light grey, dry, frozen	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.6-1.8				Silty clay and gravel fill, HF, brown, damp, stiff	
2	1.8-2.8				Sand, SP, light brown, damp to moist, orange mottling at ~ 1.8' bgs	
3	2.8-4				Sand, SP, dark grey/black, moist	PID = 12.7 ppm Odor: "diesel fuel" "Stained" black Collect soil sample from 2.8-3.3' bgs
4					EOB @ 4' bgs	
5						
10						
15						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-019	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: Near Former Guard Shack
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs   START: 2/17/05   FINISH: 2/17/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.3/4		Asphalt, silty sandy clay and gravel, HF, dark brown, frozen, dry	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.4-0.7				Silty sandy clay and gravel, HF, orange-brown, damp, loose	
	0.7-4				Sand, SP, brown to orange-brown, moist to wet at ~ 2.8' bgs, some iron stains from 1.5-2.5' bgs	Collect soil sample from 1.5-2.5' bgs
2						
3						∇ water table @ 2.8' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-020	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL (FT)	NUMBER AND TYPE	RECOVERY (FT)	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.4/4		Asphalt, sand and gravel fill, HF, dark brown to black, dry	Collect soil sample from 0.0-0.5' bgs PID = 4.0 ppm
1	0.5-2				Silty clay fill, HF, light brown, damp, slight odor	Collect soil sample from 0.5-1.5' bgs PID = 12.2 ppm @ ~ 0.9' bgs
2	2-2.9				Sand, coarse to medium, SP, light brown, moist	PID = 3.7 ppm
3	2.9-4				Sand and gravel, SP, light brown, moist to wet at 3.1' bgs	∇ water table @ 3.1' bgs PID = 5.1 ppm
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-021	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.4/4		Silt and gravel fill, HF, light tan, damp, loose	PID = 0.3 ppm Collect soil sample from 0-0.5' bgs
1	0.5-1.5				Silty clay and gravel fill, HF, brown to light tan, damp, stiff	PID = 0.8 ppm Collect soil sample from 1-2' bgs
2	1.5-3				Sand, medium to fine, SP, light brown, damp to moist	PID = 0.7 ppm
3	3-4				Sand, coarse to medium, SP, light brown, wet	∇ water table @ 3' bgs PID = 0.8 ppm
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-022	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs   START: 2/1/05   FINISH: 2/1/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.2		3.8/4		Silty clay and gravel fill, HF, light grey to light brown, damp, stiff	Collect soil sample from 0.0-0.5' bgs PID = 0.3 ppm
1	1.2-4				Sand, fine to coarse, SP, light brown to dark brown, damp to wet at ~ 3' bgs	Collect soil sample from 1-3' bgs PID = 0.8 ppm
2						
3						∇ ~ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-023	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.2' START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.5/4		Asphalt, sand and gravel fill, HF, dark brown to black, dry	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	0.6-0.9				Silty clay and gavel fill, HF, grey to light brown, damp, stiff	
1	0.9-2				Silty clay with sand fill, HF, brown, damp, stiff	
2	2-2.5				Sand, coarse to fine, SP, light brown, damp	Collect soil sample from 2-3' bgs
	2.5-3				Clayey sand, SP, dark brown to black, moist, organics	
3	3-4				Sand, medium to fine, SP, light brown to tan, moist to wet at 3.2' bgs	∇ water table @ 3.2' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-024	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4				Silt and gravel fill, HF, light grey, moist	Collect soil sample from 0.0-0.5' bgs
	0.4-1		3.3/4		Silty clayey sand with gravel, fine to medium, SC/GC, dark brown to very dark brown, damp (fill)	PID = 0.0
1	1-4				Sand, medium- to coarse-grained, brown to light brown; wet at 2.8' bgs	Collect soil sample from 1.5-2.5' bgs PID = 0.2
2						
3						∇ @ 2.8' bgs
4					EOB @ 4.0' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-025	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.5' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.8/4		Asphalt, sand and gravel fill, HF, dark brown, dry	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.8-2.2				Silty clay and gravel fill, HF, light grey to tan, moist	
2	2.2-4				Sand, fine to medium-grained, SP, brown to light brown, moist to wet at 3.5' bgs	Collect soil sample from 2-2.5' bgs
3						∇ water table @ 3.5' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-026	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		2.8/4		Asphalt, silty, sandy, clay and gravel fill, HF, black to orange-brown, moist to damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.7-1				Clayey sand, SC, dark brown, damp, fill	Collect soil sample from 1-2' bgs
	1-4				Sand, medium-grained, SP, light brown, trace gravel, moist to wet ~ 2.5' bgs	∇ water table @ 2.5' bgs
2						
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-027	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.3/4		Silt and gravel fill, light tan, damp	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
	0.8-1				Silty clayey sand, SP, dark brown to black, moist	
1	1-4				Sand, fine- to coarse-grained, SP, brown to light grown, moist to wet at 2.7' bgs	Collect soil sample from 1-2' bgs
2						
3						∇ water table @ 2.7' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-028	SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' bgs START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.2		3.4/4		Silty clay and gravel fill, HF, brown to light grey, damp, stiff	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	1.2-2.4				Silty, clayey sand, SM/SC, brown to dark brown/black, organic odor, moist, clay lenses are stiff (dark brown)	Collect soil sample from 1.5-2.5' bgs
2	2-4-4				Medium to coarse sand with occasional gravel, SP, grey/brown, moist to wet at 2.9' bgs	∇ @ 2.9' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-029	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: 3.2' bgs START: 2/1/05 FINISH: 2/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.5/4		Asphalt, silt and gravel fill, HF, dark brown, damp, loose	Collect soil sample from 0.0-0.5' bgs
1	0.4-1.5				Silty clay and gravel fill, HF, light grey to light tan, damp, stiff	
						Some purple straining @ 1.5' bgs
2	1.5-1.9				Silty sand, SM, dark brown to black, moist.	
	1.9-4				Sand, fine to medium, SP, brown, moist to wet at 3.2' bgs	
3						∇ @ 3.2' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-030	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West of New Die Cast Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.2' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.4/4		Asphalt, sandy, silty clay and gravel fill, HF, dark brown to almost white, dry, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.7-4				Sand and gravel fill, HF, some brick pieces, light brown to grey, moist to wet at ~ 3.2' bgs	
2						Collect soil sample from 2-3' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-031	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/7/05 FINISH: 2/7/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3/4		Silty clay and gravel fill, HF, light tan to to white, moist, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
	0.8-1.2				Silty sandy clay fill, HF, dark brown, loose, damp	
1	1.2-2.5				Clayey sand and gravel fill, HF, light brown to dark brown, moist, loose	Collect soil sample from 1.5-2.5' bgs
2						∇ water table @ 2.5' bgs
3	2.5-4				Sand and gravel, SP, dark grey, wet; sand is medium-grained	
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-032	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of Former PCB AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL (FT)	NUMBER AND TYPE	RECOVERY (FT)	6"-6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3				Clay and topsoil fill, HF, dark brown to black, damp, loose; some roots	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
	0.3-0.8				Silty clay and gravel with sand fill, HF, grey to tan, damp to moist	
	0.8-1.2				Sand, fine to medium, SP, brown to dark brown, moist	
1	1.2-1.4				"Pea gravel" and sand, GP, brown, damp	
	1.4-1.6				Clayey sand, SC, black, damp, "sticky"	Collect soil sample from 1.4-1.6' bgs
	1.6-4				Sand, fine to medium, SP, trace gravel, grey to light tan, damp to wet at ~ 2.9' bgs	
2						
3						
4					EOB @ 4' bgs	
5						
6						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-033	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of Former PCB/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.1' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0.0-2		3.6/4		Silty clay fill with gravel, HF, brown, damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.2-2.4				Sand, fine to medium, SP, some coal flakes in sand, light brown to brown, damp (fill)	
2						
	2.4-2.6				Coarse sand and gravel (possibly foundry sand), black to dark brown, damp (fill)	Collect soil sample from 2.4-2.6' bgs
3	2.6-4				Sand and gravel, SP, brown to light brown, moist to wet at 3.1' bgs	∇ water table @ 3.1' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-034	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: South of Former PCB/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~3.4' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.8/4		Silty, sandy, clay and gravel fill, HF, brown with occasional black coal pieces, damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.6-1.6				Silty clay and gravel fill, HF, light grey to white, damp	
2	1.6-4				Sand, fine to coarse, SP, brown, damp to moist at 2.3' bgs and wet at 3.4' bgs	Collect soil sample from 2.3' bgs
3						∇ water table @ 3.4' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-035	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.4/4		Asphalt, slag and gravel fill, HF, black, dry, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
	0.8-1				Silty gravelly fill, HF, light grey, damp, loose	
1	1-4				Sand, medium- to fine-grained, SP, brown to tan, damp to wet at ~3' bgs; trace gravel	Collect soil sample from 1-2' bgs
2						
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-037	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.9' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0.0.4		3.3/4		Clayey sand fill, brown to dark brown, damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.4-2.7				Sand, fine to medium, SP, light brown, damp to moist at 2.2' bgs	Collect soil sample from 1-2' bgs
2						
3	2.7-4				Sand, fine to medium, SP, grey, moist to wet at 2.9' bgs	∇ water table @ 2.9' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-038	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		2.3/4		Silt, sand and gravel fill, HF, light brown to black, dry, loose	Collect soil sample from 0.0-0.5' bgs r
1	1-4				Sand, medium to fine, SP, light brown, damp to wet at ~ 2.5' bgs?	Collect soil sample from 1-2' bgs
2						∇ water table @ 2.5' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-039	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.3/4		Asphalt, slag, sand, silt and gravel fill; dark brown to black, dry, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
	0.6-1.3				Silty clay and gravel fill, light brown, damp, loose	Collect soil sample from 0.6-1.3' bgs
1						
	1.3-4				Sand, medium to fine, SP, trace gravel; brown, damp to wet at 3' bgs	
2						
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-040	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: NA START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-4		2.2/4		Sand, medium to fine, SP, damp, light brown to brown, trace clay near surface; possible fill	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1						
2						Collect soil sample from 1.5-2' bgs No water table to 2.2' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-041	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.5' bgs START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3		2.9/4		Silty clay topsoil fill, HF, brown, moist, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.3-4				Sandy, medium to fine, SP, brown to light brown, damp to wet at 2.5' bgs; possible fill	
2						Some dark staining at 1.4-2.5' bgs Collect soil sample from 1.4-2.4' bgs
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-042	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Former Die Cast UST/AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 2/8/05 FINISH: 2/8/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.2				Topsoil fill, HF, black, frozen	Collect soil sample from 0.0-0.5' bgs
	0.2-0.5		3.4/4		Silty sand with clay fill, HF, brown, damp, loose	PID = 0.0 ppm
1	0.5-4				Sand, medium to fine, SP, light brown to brown, damp to wet at 3' bgs	Some black staining? throughout interval
						Collect soil sample from 1.5-2.5' bgs
2						
3						∇ water table @ 3' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-043	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road near W-5
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.2' bgs START: 2/9/05 FINISH: 2/9/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3				Topsoil fill, HF, dark brown, damp, medium, soft	Collect soil sample from 0.0-0.5' bgs
	0.3-0.6		3.5/4		Clayey sand, SC, brown with black-orange mottling, damp, possible fill	PID = 0.0 ppm
1	0.6-2.8				Sand, fine to medium, SP, brown to light tan, damp	
2						
	2.8-3				Sand with clay and silt, SC/SM, dark grey to black, organic odor, moist, sticky	Collect soil sample from 2.8-3' bgs
3						∇ water table @ 3.2' bgs
	3-4				Sand, fine to medium, SP, grey, some black fines, moist to wet at ~3.2' bgs	
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-044	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Northeast Corner of Property
ELEVATION: — DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: NA — START: 2/9/05 — FINISH: 2/9/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.8/4		Engineered fill to 4' bgs. **Not** on East Containment Cell cap. Did not sample; abandoned location.	
1						
2						
3						
4					EOB @ 4' bgs	
5						
10						
15						
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-045	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Former TCE Tanks
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.5' bgs START: 2/2/05 FINISH: 2/2/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		3.7/4		Silty clay and gravel fill, HF, light pink to light grey, damp, loose	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	0.9-2.8				Silty sandy clay and gravel fill, HF, light brown to brown, damp, stiff	Collect soil sample from 1.5-2.5' bgs
2						
3	2.8-4				Sand, medium-grained, SP, tan/brown, moist to wet at ~ 3.5' bgs; wood in tip of shoe; some mica flakes	∇ water table @ ~ 3.5' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-046/MIP-028 SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs START: 2/10/05 FINISH: 2/10/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.2		3.4/4		Sandy, silt and gravel fill, HF, brown to light grey to light orange-brown, dry to damp at 0.7' bgs	PID = 0.0 ppm
1	1.2-4				Sand, fine to coarse, SP, light brown (grey black from 1.6-1.9' bgs), moist to wet at 2.8' bgs	Collect soil sample from 1.2-2.2' bgs
2						
3						∇ water table @ 2.8' bgs
4					EOB @ 4' bgs	Collect groundwater grab sample from 3-7' bgs
5						
10						Collect groundwater grab sample from 10-14' bgs
15						Collect groundwater grab sample from 16-20' bgs
20						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-047/MIP-021	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: In Building, North Portion of Former Metal Working Area
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 8.5' below floor START: 2/10/05 FINISH: 2/10/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-2.7		3.7/4		Silty sandy clay and gravel fill, HF, light brown to dark brown, dry, loose	PID = 14.7 ppm at 1.4'
1						Collect soil sample from 1-2' bgs
2						
	2.7-4				Sand and gravel fill, SP, light brown to dark brown, dry, loose	PID = 5.3 ppm
3						
						No water table encountered to 8'
4						
						Water table ~ 8.5' from GW grab sample
						Collect GW grab sample from 8-12' bgs
10						
15						
						Collect GW grab sample from 18-22' bgs
20						
25						
						Collect GW grab sample from 26-30' bgs
30						
35						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-048/MIP-026 SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: In Building, North Portion of Former Metal Working Area
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: NA
START: 2/11/05
FINISH: 2/11/05
LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1	Concrete floor	2.8/4		Silty, sandy, clay and gravel fill, HF, orange-brown to brown, damp, loose	PID = 11.4 ppm
1	1-1.7				Sand, fine, with occasional clay intervals, fill, HF, light brown to brown, damp	PID = 13.2 ppm
2	1.7-4				Sand, coarse predominantly to fine, light brown, dry (crunchy dry); possible fill	PID = 15 ppm at ~ 2' bgs. Collect soil sample from 1.7-2.7' bgs
						No water table encountered to ~4' bgs
3						
4					EOB @ 4' bgs	
5						
						Collect groundwater grab sample from 7.5-11.5' bgs
10						
						Collect groundwater grab sample from 13-17' bgs
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-049/MIP-15	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: In Building, Near Old Die Cast Area (just East)
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: NA START: 2/11/05 FINISH: 2/11/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		2.4/4		Silty sandy clay and gravel fill, HF, brown, dry to damp, loose	PID = 0.3 ppm
	0.6-4				Sand, medium to fine, SP, tan to brown, dry, loose; possible fill	PID = 0.3 ppm
1						Collect soil sample from 1-2.4' bgs
2						No water table encountered
3						
4					EOB @ 4' bgs	
5						
						Collect groundwater grab sample from 6-10' bgs
10						
						Collect groundwater grab sample from 14-18' bgs
15						
20						Collect groundwater grab sample from 25-29' bgs

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-050	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.1' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		3.3/4		Topsoil fill, HF, dark brown/black, damp, soft	Collect soil sample from 0.0-0.5' bgs PID = 0.0 ppm
1	1-1.8				Silty clay fill, HF, light brown, damp, stiff	Collect soil sample from 1-1.8' bgs
2	1.8-4				Sand, SP, light brown/tan with dark brown/black laminations, damp to wet at ~ 3.1' bgs; random coal	
3						∇ water table @ 3.1' bgs
4					EOB @ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-051	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.2' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.5/4		Topsoil, HF, dark brown/black, moist, soft	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
	0.7-1.4				Silty clay fill, HF/CL, brown, damp, stiff	PID = 0.1 ppm
1						
	1.4-3				Sand, SP, brown, damp	PID = 0.4 ppm at top of sand Collect soil sample from 1.4-3' bgs
2						
3						
	3-3.5				Sand and gravel, SP, moist to wet at 3.2' bgs	∇ water table @ 3.2' bgs
4					EOB @ ~ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-052	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: 2.8' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4				Topsoil, HF, dark brown/black, moist	Collect soil sample from 0-0.5' bgs
	0.4-1.3		2.7/4		Silty clay fill, HF, brown, damp, stiff to medium stiffness	PID = 0.0 ppm
1						Collect soil sample from 0.5-1.3' bgs
	1.3-4				Sand, SP, light brown to brown, damp to wet @ 2.8' bgs	
2						
3						
4					EOB @ ~ 4' bgs	
5						
10						
15						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-053	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: No water table encountered START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6				Topsoil, HF, dark brown to black, moist	Collect soil sample from 0-0.5' bgs
	0.6-2.3		3.8/4		Silty clay fill, HF, brown to light brown, damp, stiff	PID = 0.0 ppm
1						
2						
	2.3-4				Sand, SP, brown with dark brown silty seams, damp	Collect soil sample from 2.3-3.8' bgs
3						
4					EOB @ ~ 4' bgs	
5						
10						
15						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-054	SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.7' bgs START: 2/17/05 FINISH: 2/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		4/4		Topsoil fill, HF, dark brown/black, damp, medium/soft stiffness	Collect soil sample from 0-0.5' bgs PID = 0.0 ppm
1	0.6-2.7				Silty clay with sand, fill, HF, brown to orange-brown, damp, stiff	Collect soil sample from 0.6-2.7' bgs
2						
3	2.7-3.3				Silty, sandy clay and gravel fill, HF, brown, damp	
4	3.3-4				Sand, SP, grey-brown to brown, damp to wet at ~ 3.7' bgs EOB @ ~ 4' bgs	
5						
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-055	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: Near Corporate Building/MIP-53
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.2' bgs   START: 2/22/05   FINISH: 2/22/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.4/4		Topsoil fill, HF, dark brown, damp	PID not working Refer to SO-053 log
1	0.6-2.3				Silty clay with sand fill, HF, orange-brown, damp, stiff	
2						
3	2.3-6				Sand, SP, with gravel (random) and minor clay (2.5-2.8' bgs) (4.4-4.8' bgs) light brown to dark brown, damp to wet at ~ 5.2' bgs	
4						Collect soil sample from 4-5' bgs
5						∇ water table @ ~ 5.2' bgs
6						Collect GW grab sample from 6-10' bgs Collect GW grab sample from 19-23' bgs Collect GW grab sample from 27-31' bgs; slight "sulfur" odor
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-056	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: In Building, Just West of Triax/MIP-046
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: NA START: 2/22/05 FINISH: 2/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3		2.3/4		Silty sandy gravel fill, HF, brown, dry, loose	PID = 0.2 PPM
	0.3-0.7				Clayey, silty, sand, HF, brown, damp	PID = 2.9 ppm
1	0.7-4				Sandy fill with some clay, HF, light brown to dark brown, dry, loose; clay ~1.7-2' bgs	PID = 2.5 ppm Dark brown 1.7-2' bgs could be staining. PID = 5.9 ppm. Collect soil sample from 1.7-2' bgs. PID = 1.7 ppm
2						
3						
4						
5						Collect GW grab sample from 6-10' bgs Collect GW grab sample from 16-20' bgs Collect GW grab sample from 25-29' bgs
10						
15						
20						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-057	SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Former PCB Tanks/MIP-027
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.1' bgs START: 2/23/05 FINISH: 2/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.3/4		Asphalt, silty sandy clay fill, HF, dark brown to orange-brown, damp, medium slag at ~ 0.1' at bottom of interval	PID = 0.0 ppm
1	0.8-1.4				Silty sand and gravel fill, HF, orange-brown, damp, loose	
	1.4-1.6				Clayey sand, SP, dark brown, damp	
2	1.6-4				Sand, SP, with random gravel, light brown/tan, damp to wet at ~ 3.1' bgs	
3						
4						
5						Collect GW grab sample from 5-9' bgs Collect GW grab sample from 17-21' bgs Collect GW grab sample from 26.5-30.5' bgs. Product "DNAPL" encountered.
10						
15						
20						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-058/MIP-032 SHEET 1 OF 1

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Inside Building, Metal Working
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: START: 3/1/05 FINISH: 3/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		2.2/4		Silty sandy clay and gravel fill, HF, brown, damp	PID = 0.5 ppm
1	0.7-1.1				Sand, SP, light brown to brown, dry, possible fill	PID = 0.7 ppm
	1.1-1.7				Clayey sand, dark brown, dry, loose, some random large sand-sized coal fragments	Possible staining PID = 0.8 ppm Collect soil sample from 1.1-1.7' bgs
2	1.7-4				Sand, SP, dark brown, dry	PID = 0.5 ppm
3						
4						
5						Collect GW grab sample from 9-13' bgs Collect GW grab sample from 19-23' bgs Collect GW grab sample from 28-32' bgs
10						
15						
20						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-059/MIP-012 SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Former Union Trailer/MIP-012
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.2' bgs START: 3/1/05 FINISH: 3/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1		2.5/4		Asphalt, silty clay, sand and gravel fill, HF, stiff to medium brown to orange-brown, damp	PID = 0.0 PPM
1	1-4				Sand, SP, brown with dark brown/ black layers from ~ 1-1.8' bgs, random gravel, moist to wet at ~ 2.2' bgs	
2						
3						
4						
5						Collect GW grab sample from 8-12' bgs Collect GW grab sample from 16-20' bgs Collect GW grab sample from 22-26' bgs
10						
15						
20						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-060/MIP-050 SHEET 1 OF 1

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South and East of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3' bgs START: 3/1/05 FINISH: 3/1/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.8/4		Asphalt, silt, sand and gravel fill, HF, dark brown/black, dry, loose	PID = 0.0 PPM
1	0.5-1.5				Silty sandy clay and gravel fill, HF, light grey to brown, damp to moist at 1.2' bgs, loose	
2	1.5-2				Sand, SP, brown to brown/black, moist, ~ 2" zone of small sand-sized coal pieces 1.7-1.9' bgs	Collect soil sample from 1.5-2' bgs
3	2-4				Sand, SP, dark grey with some black layering near top of interval, moist to wet at ~ 3' bgs; trace decomposed organic matter near bottom of interval	
4						
5						Collect GW grab sample from 5-9' bgs Collect GW grab sample from 20-24' bgs Collect GW grab sample from 28-32' bgs
10						
15						
20						

PROJECT NUMBER 186305.FI.01	BORING NUMBER SO-061	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Trim Building/Former AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/14/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.4/4		Silty gravel fill, HF, light grey to white, damp, loose	PID = 0.0 ppm
1	0.7-1.3				Silty, sandy, clay and gravel fill, HF, brown to orange-brown, damp, loose	
2	1.3-2.3				Clayey sand and gravel fill, HF, medium to fine-grained sands, dark brown/black from 1.3-1.6' bgs, tan/brown 1.6-2.3' bgs, moist	Collect soil sample from 1.6-2.3' bgs Collect from second soil core geotech sample from 1.3-2.3' bgs
3	2.3-4				Sand and gravel, SP, coarse to medium-grained, grey-brown, moist to wet at 2.7' bgs; gravel is well rounded	PID = 0.0 ppm ∇ water table at 2.7' bgs
4	4-9.2		4/4		Sand and gravel, SP, coarse to medium-grained, grey brown, wet; gravel is well rounded	PID = 0.0 ppm Collect geotech sample from 4-6' bgs
5						
6						Collect soil sample from 6-8' bgs
7						
8			2.7/4			
9	9.2-12				Sand, SP, fine- to medium-grained, grey brown, wet	PID = 0.0 ppm
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-061	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Trim Building/Former AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/14/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-13.7		3.3/4		Sand and gravel, SP/SW, fine to coarse sands, brown, wet, coarse sands from 12-12.5' and 13.3-13.7' bgs; gravel is subangular to well-rounded	PID = 0.0 ppm
13						
	13.7-16				Silty sand, SP/SM, fine-grained sand, trace gravel, brown to dark brown, wet	End 3/14/05
14						
15						
16						
	16-20		1.3-4		Silty sand, SP/SM, fine-grained, brown, wet	Start 3/15/05 PID = 0.0 ppm
17						
18						
19						
20						
	20-24		2.5-4		Silty sand, SP/SM, fine-grained, grey-brown to brown, wet	PID = 0.0 ppm
21						
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-061	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: North of Trim Building/Former AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs   START: 3/14/05   FINISH: 3/15/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	24-26.5		3/3		Silty sandy clay, CL, brown, wet, medium	Collect soil sample from 24-24.5' bgs Collect geotech sample from 24.5-26.5' bgs
25						PID = 0.0 ppm
26						
	26.5-27				Till, silty clay and gravel, CL, dark grey/brown, stiff	PID = 0.0 ppm
27					EOB @ 27' bgs, refusal	
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-062	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		2.3/4		Silty clay and gravel fill, HF, white to light brown, dry, loose	~ 9" of concrete above soil PID = 0.9 ppm
1	0.8-1.3				Silty clay and gravel fill, HF, orange brown, damp, medium	PID = 29.4 ppm Collect soil sample from 0.8-2.3' bgs
	1.3-4				Sand and gravel, SP, fine to coarse sand, dark brown, loose, moist	PID = 222 ppm, "sheen," "diesel fuel" odor
2						
3						
4	4-8		1.5/4		Sand and gravel, SP, fine to coarse sand, dark brown, wet, loose	Collect soil sample from 4-5.5' bgs PID = 158 ppm, "sheen," "diesel fuel" odor
5						
6						
7						
8	8-12		NA ◄	Liner bent in tube, pour contents out	Sand and gravel, SP, brown to dark brown, wet; sands are fine to medium	PID = 12.3 ppm
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-062	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-13.7		3/4		Sand, SP, brown, wet; sands are fine to medium	PID = 8.9 ppm
13						
	13.7-14.4				Sand and gravel, SP, fine to coarse sand, brown, wet	PID = 41.9 ppm
14						
	14.4-16				Sand, SP, brown, wet, fine to medium sands	PID = 6.8 ppm
15						
16						
	16-20		3.1/4		Sand, SP, brown, wet, trace gravel from 16.8-17.3' bgs; sand is fine- to medium-grained	PID = 35.1 ppm
17						
18						
19						
20						
	20-24.6		3/4		Silty sand, SP/SM, grey/brown to brown, wet; trace gravel, sand is fine- to medium-grained	PID = 156.3 ppm Collect geotech sample from 20.5-22' bgs
21						
22						Collect soil sample from 22-24.6' bgs
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-062	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	24.6-25.5		0.6/1.5		Silty sand and gravel, SP/SM, brown, wet; gravel is angular to rounded; trace shell fragments, gravel of various mineralogy	PID = 91.6 ppm "Sheen" on water out of borehole
26					Refusal @ 2.25' bgs	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

SOIL BORING LOG

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-063	SHEET 1 OF 2

PROJECT: OMC Plant 2 RI/FS   LOCATION: Near Northwest Loading Dock
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate)   START: 3/15/05   FINISH: 3/15/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.4/4		Silty sand and gravel fill, HF, light brown, dry, loose	
	0.7-1.5				Silty sandy clay fill, HF, orange/brown, dry, loose	PID = 0.0 ppm
1						
	1.5-6				Silty sand, SP/SM, light brown to dark grey, black streaks near top of interval, moist to wet at 4' bgs; trace gravel, sands are fine to medium	Collect geotech sample from 1.5-2.5' bgs
2						
3						Collect soil sample from 2.6-3.4' bgs
4			4/4			∇ water table @ ~4' bgs (rough estimate)
5						
6	6-6.3				Silty clay, OL, black, wet, highly organic, partially decomposed plant matter	PID = 0.0 ppm
	6.3-7				Sand, SP, light brown, wet, trace gravel; sands are fine to medium	Collect geotech sample from 6.5-7.5' bgs
7	7-8				Sand and gravel, SP, grey-brown, wet; trace shell fragments; gravels are well rounded	Collect soil sample from 7.5-8' bgs PID = 0.0 ppm
8	8-8.3		3.6/4		Gravel, SP, various colors, wet; rounded gravels	
	8.3-12.7				Sand and gravel, SP, grey-brown, wet, trace shell fragments	PID = 0.0 ppm
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-063	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Northwest Loading Dock
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12.7-23.5				Silty sand, SP/SM, brown, wet; trace gravel and shell fragments	PID = 0.0 ppm
13						
14						
15						
16			3.1/4			PID = 0.0 ppm
17						
18						
19						
20			2.5/3.5			Collect geotech sample from 20.5-22' bgs
21						PID = 0.0 ppm
22						Collect soil sample from 22-22.5' bgs
23						
					Refusal at 23.5' bgs	
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-064	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property, Near Fan Rooms
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.3	2.4/4			Silty, sandy gravel fill, HF, brown to dark brown to dark brown, damp to wet at 1' bgs, loose (1-1.3' gravel zone)	Collect soil sample from 0-1' bgs PID = 1.9 ppm ∇ water table @ ~1' bgs
1	1.3-4				Silty sand, SP/SM, grey-brown, wet	PID = 0.5 ppm
2						
3		3/4				
4	4-6.2				Silty sand and gravel, SP/SM, grey-brown, wet	PID = 0.6 ppm Sheen Collect soil sample from 4-6.6' bgs
5						
6	6.2-6.6				Gravel, GP, well-rounded to angular, grey, wet	PID = 9.7 ppm Sheen, "diesel" fuel odor
7	6.6-12				Sand and gravel, SP, medium sands, brown, wet	
8		3.4/4				PID = 0.5 ppm
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-064	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property, Near Fan Rooms
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-17.2	3.3/4			Sand and gravel, SP, fine to coarse sands, brown to grey-brown, wet; decomposing organic matter (tree branch) at ~ 14.7' bgs, just above gravelly layer, and at 17-17.2' bgs	PID = 0.0 ppm
13						
14						
15						
16			1.5/2			Collect soil sample from 16-17.5' bgs
17	17.2-18				Sand, SP, brown, wet, fine- to medium-grained sands	PID = 0.0 ppm
18					Refusal at 18' bgs	
19						
20						
21						
22						
23						
24						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-065	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property Near MIP-028
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		3.6/4		Asphalt, silty sandy clay and gravel fill, HF, dark brown to orange-brown, dry to damp at 0.7' bgs	PID = 0.0 ppm Collect geotech sample from 0.9-1.9' bgs
1	0.9-1.6				Sand, SP, brown to dark brown, damp, fine to medium sands	
	1.6-5.6				Sand, SP, brown, damp to wet at 2.7' bgs	
2						Collect soil sample from 1.9-2.7' bgs
						∇ water table @ ~ 2.7' bgs
3						
4						PID = 0.0 ppm
			3.6/4			
5						
	5.6-8				Sand and gravel, SP, brown, wet, fine to coarse sands	
6						Collect soil sample from 6-6.4' bgs PID = 0.0 ppm Collect geotech sample from 6.4-7.4' bgs
7						
8	8-21		3/4		Sand, SP, grey-brown, wet, fine to medium sands; trace granules and gravel, gravel is rounded	PID = 0.0 ppm
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-065	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property Near MIP-028
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.3/4		Very coarse sand interval 12-12.5' bgs	PID = 0.0 ppm
13						
14						
15						
16			3/4			PID = 0.0 ppm
17						
18						
19						Collect soil sample from 19.5-20' bgs
20			1/1			Collect geotech sample from 20-21' bgs
21					EOB, refusal at 21' bgs	
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-066	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Along Eastern Access Road
ELEVATION: — DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs — START: 3/16/05 — FINISH: 3/16/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.2				Topsoil fill, sandy, HF, dark brown, dry, loose	
	0.2-3.4		3.8/4		Sand, SP, brown, damp to wet at ~ 2.1' bgs; medium sands	Collect soil sample from 0.5-1' bgs PID = 0.8 ppm
1						Collect geotech sample from 1-2' bgs
2						∇ water table @ ~ 2.1' bgs
3						
	3.4-4				Sand, SP, grey, wet, medium sands	PID = 1.1 ppm
4	4-10.3		4/4		Sand, SP, brown to grey-brown, wet, medium with trace coarse sands and gravel (rounded)	Collect soil sample from 4.5-5' bgs PID = 0.0 ppm
5						Collect geotech sample from 5-6.5' bgs
6						
7						
8			3/4		Black laminations/bedding at 8.2-8.3' bgs and 9.1-9.2' bgs	
9						
10	10.3-20				Sandy, SP, grey to grey-brown, wet; sands are fine to medium-grained; trace granules (rounded) and coarse sands	PID = 0.0 ppm
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-066	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.3/4			PID = 0.0 ppm
13					13	
14					14	
15					15	
						PID = 0.0 ppm
16					16	PID = 0.0 ppm
			2.8/4			
17					17	
18					18	
19					19	PID = 0.0 ppm
20					20	
	20-29		NA	Liner bent in sampler, empty contents out	Sand, SP, grey, wet; sand is fine-grained	
						PID = 0.0 ppm
21					21	
22					22	
23					23	
24					24	

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-066	SHEET 3 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			NA	Liner bent in sampler, empty contents out	Silty sand, SP/SM, grey, wet.	
25						PID = 0.0 ppm
26						
27						
28			2.8/3			Collect soil sample from 28-29' bgs
29						PID = 0.0 ppm
	29-29.6				Silty clay, CH, brown, wet, "sticky," high plasticity, > 4" ribbons	Collect geotech sample from 29-30' bgs
	29.6-30.1				Silty sandy gravel, GM, grey/brown, wet; gravel is subangular to subrounded	PID = 0.0.ppm
30	30.1-31				Silty clay and gravel till, CL, brown, wet, stiff	PID = 0.0 ppm
31						
					EOB @ 31.0' bgs (refusal)	
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-067	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
0	0-3.2		3.6/4		Silty sandy clay and gravel fill, HF, brown, dark brown, orange-brown, dry, loose	PID = 9.7 ppm
1						
2						PID = 17.3 ppm
3	3.2-5.8				Silty sand and gravel fill, HF, orange-brown, dry, loose	PID = 15 ppm
4			3.3/4			PID = 12.3 ppm Collect soil sample from 4.5-5' bgs
5						Collect geotech sample from 5-6' bgs
6	5.8-6.5				Sandy silty clay, GL, dark brown/black, some decomposing organic material, wet	∇ water table @ ~6' bgs PID = 1.7 ppm Collect soil sample from 6-6.5' bgs PID = 8.1
7	6.5-12				Sand and gravel, SP, brown, wet; sand is fine to granular; gravel is subrounded to rounded	Collect geotech sample from 6.5-7.5' bgs
8			2.8/4			PID = 45.7 ppm
9						
10						PID = 15.7 ppm
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-067	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-16.5		2.9/4		Sand, SP, brown, wet; trace gravel; sand is fine to medium	PID = 24.9 ppm
13						PID = 55.9 ppm
14						PID = 121 ppm
						PID - 53.5 ppm
15						
						PID - 61.4 ppm
16						PID = 63.8
			2.7/4		Silty sand, SP/SM, grey with dark brown/ black laminations, wet; decomposing organics	PID = 72.5
	16.5-17					
17	17-19.3				Sand and gravel, SP, grey brown to brown, wet; sand grains medium to granular; gravel subangular to rounded	PID - 70.4
18						
19	19.3-28.6				Silty sand, SP/SM, grey to grey/brown, wet; some black laminations (few); sand is very fine to medium	PID = 91.8
20			2.3/4			
						PID = 97.6
21						
22						PID = 33.3
23						
						PID = 34.5
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-067	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			PID = 3.2
25						PID = 0.0
26						PID = 0.0
27						PID = 0.0
28						Collect geotech sample from 28-28.8' bgs No soil sample collected
	~ 28.6-28.8	2.9/3.5			Silty sandy gravel, GM, unable to determine colors, wet	
29	28.8-31.5				Silty clay till, CL, grey/brown, wet	
30						
31						PID = 0.0 ppm
					EOB @ 3.15' bgs (refusal)	
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-068	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Metal Plating Room
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler
WATER LEVELS: ~ 5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-5		3.4/4		Silty sand and gravel fill, HF, brown to orange-brown, loose, dry	
1						Collect geotech sample 1-2.5' bgs
2						
3						Collect soil sample 2.5-3.4' bgs
4			3/4			
5	5-8				Sand and gravel, SP, brown, wet, medium sands, subangular to rounded gravel	∇ water table @ ~ 5' bgs Collect soil sample from 5-5.5' bgs Collect geotech sample from 5.5-6.5' bgs
6						
7						
8	8-8.8		2.8/4		Sand and gravel, SP/SW, brown, wet, coarse to granular sands (very coarse sands)	
9	8.8-16				Sand, SP, light brown, wet, trace gravel, rounded to subrounded	
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-068	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Metal Plating Room

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler

WATER LEVELS: ~ 5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3/4			Odor similar to "machinery" throughout interval
13						
14						
15						
16	16-20		3.1/4		Sand, SP, grey-brown, wet; sands are fine to medium	Odor similar to "machinery"/"burnt oil" throughout interval
17						
18						
19						
20	20-28.5		3/4		Silty sand, SP/SM, grey, wet; sands are fine-grained, some cross-bedding is visible as black laminations	Odor similar to "machinery"/"burnt oil"
21						
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-068	SHEET 3 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Near Metal Plating Room
ELEVATION: — DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler
WATER LEVELS: ~ 5' bgs — START: 3/21/05 — FINISH: 3/21/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			
25						Odor similar to "machinery"/"burnt oil"
26						
27						
						Fine-grained sandstone in sampler shoe
28						
	28.5-28.6		3.5/3.5		Gravel, GP/GM, grey, wet, subangular	Collect soil sample from 28-28.6' bgs
	28.6-31.5				Silty clay till, CL, grey, dry, very stiff	
29						
30						
31						
					EOB @ 31.5' bgs	
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-069	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		2/4		Silty sand and gravel fill, HF, orange-brown to grey, dry	PID = 0.0 ppm Collect soil sample from 0-1.7' bgs
1	0.9-6				Sand and gravel fill, HF, light brown to brown, dry to moist; wood (decomposed) at 1.7-1.9' bgs	PID = 0.0 ppm
2						
3						
4			2.9/4			Collect geotech from 4-5.5' bgs
5						
6	6-6.3 6.3-9.2				Silty clay, OH, dark brown, wet Sand and gravel, SP, grey-brown, wet; medium sands	∇ water table @ ~ 5.5' bgs Collect geotech sample from 5.5-6.5' bgs PID = 0.0 ppm
7						
8			2.4/4			Collect soil sample from 8-10.4' bgs
9	9.2-9.4 9.4-15.4				Sand and gravel, SP, grey, wet, very coarse sands Sand, SP, grey to grey/brown, wet; medium sands, trace gravel	PID = 0.0 ppm
10						
11						
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-069	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
					Trace coarse sand from 12.1-12.3' bgs	
			3.6/4			PID = 0.0 ppm
13						
14						
15						
	15.4-20				Sand, SP, grey, wet; sand is fine- to medium-grained; trace gravel	
16						Odor similar to "machinery" or "burnt oil"
			2.8/4			PID = 0.0 ppm
17						
18						
19						
20						
	20-25.5				Silty sand, SP/SM, grey, wet; sand is very fine- to fine-grained; trace gravel	PID = 0.0 ppm
			2.5/4			
21						
22						
						PID = 0.0 ppm
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-069	SHEET 3 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.4/4			Collect soil sample from 24-25.5' bgs
25						
26	25.5-27.5				Silty sand and gravel, SP/SM, grey, wet; gravel of various sizes; subangular to rounded gravel	PID = 0.0 ppm
27						Collect geotech sample from 26.5-27.5' bgs
28	27.5-28				Silty clay, CL, dark grey, very stuff, dry	PID = 0.0 ppm
					EOB @ 28' bgs	
29						
30						
31						
32						
33						
34						
35						
36						

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CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-070	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Metal Working Area Just West of Triax

ELEVATION: — DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler

WATER LEVELS: ~ 5.5' bgs — START: 3/22/05 — FINISH: 3/22/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		3.8/4		Silty sandy clay and gravel fill, HF, orange-brown to dark brown, dry to damp at ~ 1' bgs, loose	PID = 2.1
1	0.9-2				Sandy fill, HF, light brown, damp, trace gravel; sand is fine- to medium-grained	PID = 3.4
2	2-2.7				Sandy clay fill, HF, brown to dark brown, damp, trace gravel	PID = 2.4
	2.7-3.3				Sandy fill, HF, light brown, damp	PID = 2.1
3	3.3-5				Clayey sand fill, HF, dark brown to brown, damp	Collect soil sample from 3.3-4.5' bgs PID = 14.3
4			2.9/4			Collect geotech sample from 4.5-5.5' bgs
5	5-8				Sand, SP, light brown, damp to wet at 5.5' bgs; trace gravel	PID = 0.0 ppm ∇ water table @ ~ 5.5' bgs
6						
7						
8	8-8.4		3/4		Sand and gravel, SP, light brown, wet; gravel is subrounded to well rounded; very coarse sands from 8-8.4' bgs; otherwise, medium sands	Collect geotech sample from 8-9.5' bgs PID = 0.0 ppm
	8.4-17.6				Sand, SP, brown, wet, trace gravel; sands are medium with occasional coarse sands	
9						PID = 0.0 ppm Collect soil sample from 9.5-10.5' bgs
10						
11						
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-070	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Just West of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler
WATER LEVELS: ~ 5.5' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			
13						
14						
15						
16						
			2.3/4			PID = 0.0 ppm
17						
	17.6-17.8				"Gravels increase just above silty clay;" silty clay, CL, grey, wet, very soft	PID = 0.0 ppm Odor similar to "burnt oil"
18	17.8-21.3				Sand, SP, grey/brown, wet, fine to medium sands	
19						
20						
21						PID = 0.0 ppm
	21.3- ?	Not able to determine--sample liner stuck			Silty sand, SM/SP, grey, wet	Odor similar to "burnt oil"
22						
23						
						PID = 0.0 ppm
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-070	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Just West of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler
WATER LEVELS: ~ 5.5' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			
25					25	
26					26	PID = 0.0 ppm
27					27	
28					28	Collect soil sample from 28-28.9' bgs PID = 0.0 ppm
			1.9/3			
29					29	Collect geotech sample from 28.9-29.9' bgs
30					30	
31					31	
					EOB at 31' bgs (refusal)	
32					32	
33					33	
34					34	
35					35	
36					36	

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: ~ 100' East of Former Solvent Recycling Unit
ELEVATION: — DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.4' bgs — START: 3/22/05 — FINISH: 3/22/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.6/4		Silty, sandy clay and gravel, HF, orange-brown, dry, loose	PID = 0.0 ppm
	0.5-1.1				Sand and gravel fill, HF, light brown, dry; sand is predominantly fine grained	PID = 0.0 ppm
1	1.1-5.7				Sandy fill, HF, light brown, dry to wet at 5.4' bgs, loose; trace clay lenses in sand; trace gravel	
2						
						Collect geotech sample from 2.4-3.4' bgs PID = 0.0 ppm
3						
4			3/4			Collect soil sample from 4-5' bgs
5						PID = 0.0 ppm ∇ water table @ ~ 5.4' bgs
	5.7-6.4				Silty clayey sand, SC, grey to black, wet; trace gravel, trace decomposed organics	PID = 0.0 ppm
6	6.4-16				Sand, SP, grey-brown to grey, wet; trace gravel (rounded); fine to medium sands; occasional dark grey cross-bedding	PID = 0.0 ppm
7						
8			3.1/4			Collect geotech sample from 8.3-9.3' bgs
9						Collect soil sample from 9.3-10.3' bgs PID = 0.0 ppm Odor similar to "burnt oil"
10						
11						PID = 0.0 ppm
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-071	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of Former Solvent Recycling Unit
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.4' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			PID = 0.0 ppm
13						
14						Odor similar to "burnt oil"
15						
16	16-23.6	Liner stuck, could not determine recovery			Sand, SP, light grey to light brown, wet, sands predominantly fine-grained; occasional grey-colored cross-bedding	PID = 12.4 ppm Odor similar to "burnt oil"
17						
18						PID = 6.6 ppm
19						
20			2/4			PID = 17.0 ppm
21						PID = 23.9 ppm
22						PID = 15.3 ppm Odor similar to "burnt oil"
23						
24	23.6-25.1				Silty sand, SM/SP, light grey to light brown, wet; sands are very fine to fine-grained	PID = 15.1 ppm

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-071	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of Former Solvent Recycling Unit
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.4' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/3			PID = 43.8 Collect geotech sample from 24-25' bgs
25	25.1-27				Sand, SP, grey/brown, wet; sands are fine- to medium-grained	Collect soil sample from 25-26.1' bgs PID = 20.6
26						
27					EOB @ ~ 27' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-072	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just North of Seahorse Drive, South of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.5/4		Silty clay fill, HF, dark brown, damp, medium (topsoil)	PID = 0.0 ppm
	0.5-2				Silty sand and gravel fill, HF, dark brown, moist, loose	
1						Collect geotech sample from 1-2' bgs PID = 0.0 ppm
2	2-2.8				Sand, SP, brown to light brown, moist, fine to medium sands, loose	Collect soil sample from 2-2.8' bgs PID = 0.0 ppm
3	2.8-6.1				Sand, SP, light tan/brown, wet, loose, medium to coarse sands; trace gravel; coarse sand layer from 5.7-5.9' bgs	PID = 0.0 ppm
4			4/4			Collect soil sample from 4-5' bgs
5						Collect geotech sample from 5-6' bgs
6	6.1-13.2				Sand, SP, grey/brown, wet, loose, medium to coarse sands; trace gravel, dark grey laminations/cross-bedding from 6.3-6.5' bgs	PID = 0.0 ppm
7						PID = 0.0 ppm
8			3.1/4			
9						PID = 0.0 ppm
10						
11						PID = 0.0 ppm
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-072	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS | LOCATION: Just North of Seahorse Drive, South of Triax
ELEVATION: | DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs | START: 3/23/05 | FINISH: 3/23/05 | LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			
13	13.2-20.9				Sand, SP, grey to grey/brown, wet; fine to medium sands; trace gravel	PID = 0.0 ppm
14						
15						
16			2.7/4			PID = 0.0 ppm
17						
18						
19						PID = 0.0 ppm
20			3/4			
21	20.9-26.6				Silty sand, SM/SP, light grey/brown, wet; predominantly fine sands	PID = 0.0 ppm
22						
23						
24						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-072	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just North of Seahorse Drive, South of Triax

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.8' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.4/2.6			Collect soil sample from 24-24.4' bgs Collect geotech sample from 24.4-25.4' bgs
25						PID = 0.0 ppm
26						
27					EOB @ 26.6' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-073	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS | LOCATION: Along North Ditch NE Corner of Site

ELEVATION: | DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 1.5' bgs | START: 3/23/05 | FINISH: 3/23/05 | LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3		2.5/4		Sandy topsoil and gravel fill, HF, brown to light brown, damp, loose	PID = 0.0 ppm
	0.3-4.8				Sand, SP, light brown, damp to wet at ~ 1.5' bgs; trace gravel	PID = 0.0 ppm
1						
2						
3						PID = 0.0 ppm
4			3/4			
5	4.8-8				Silty sand, SM, dark grey, wet, trace gravel; sands are fine to medium; gravel is angular to rounded	Odor: "organics" PID = 0.0 ppm
6						
7						
8	8-13.8		2.6/4		Sand, SP, grey to grey/brown, wet, fine to coarse sands; trace gravel; very coarse sands from 8-8.4' bgs and 9.8-10.3' bgs are dark grey to black in color; black coating on gravels	PID = 0.0 ppm PID = 0.0 ppm Odor: "organics"
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-073	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along North Ditch NE Corner of Site
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1.5' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4		Very coarse sands and gravel from 12-12.5' bgs are dark grey to black in color; black coating on gravels;	Odor: "organics"
13						
14	13.8-25				Silty sand, SP, grey/brown, wet; trace gravel; sands are very fine to medium	PID = 0.0 ppm
15						
16						PID = 0.0 ppm
			2.2/4			
17						
18						
19						
20						
			2.6/4			
21						
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-073	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along North Ditch NE Corner of Site
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1.5' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			PID = 0.0 ppm
25	25-25.3				Silty sandy clay, SC, grey/brown, wet, laminations throughout interval	
	25.3-28.5				Silty sand, SM/SP, grey brown, wet, laminations from 25.3-25.7' bgs	
26						
27						
28						
					EOB @ 28.5' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-074	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.5/4		Asphalt, silty sandy gravel fill, HF, grey to brown dry, loose	PID = 0.0 ppm Collect soil sample from 0.4-0.8' bgs
1	0.4-1.7				Silty sandy clay and gravel fill, HF, brown to light tan, dry to damp, loose, some brick pieces at bottom of interval	Collect geotech sample from 0.5-1.5' bgs
2	1.7-2.4				Silty, sand and gravel fill, HF, black, moist to wet at 2.1' bgs	PID = 0.0 ppm Collect soil sample from 2.1-2.4' bgs
3	2.4-4.8				Sand, SP, light brown, wet, trace gravel, mediun sands	Possible "foundry sands" PID = 0.0 ppm PID = 0.0 ppm Collect geotech sample from 2.5-3.5' bgs
4			3.6/4			
5	4.8-6.1				Sand and gravel, SP, light brown, wet, medium sands	PID = 1.4 ppm
6	6.1-6.7				Sand and gravel, GP/SP, light brown, wet, very coarse sands, gravel is rounded to subrounded	PID = 2.8 ppm
7	6.7-10.7				Sand, SP, light brown, wet, trace gravel and medium sands	PID = 7.4 ppm
8			3.6/4			
9						PID = 9.9 ppm
10						PID = 8.1 ppm
11	10.7-17.3				Sand, SP, grey/brown, wet, fine to medium sands, trace coarse sands and gravel	PID = 7.6 ppm
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-074	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
12		Liner stuck; unable to determine recovery				PID = 11.0 ppm
13						PID = 9.9 ppm
14						
15						
16			2.5/4			PID = 10.8 ppm
17	17.3-25.2				Silty sand, SM/SP, grey to grey/brown, wet, dark grey silt laminations near top of interval	PID = 6.7 ppm
18						
19						PID = 5.8 ppm
20			2.9/4			
21						PID = 6.7 ppm
22						Collect soil sample from 22 to 22.9' bgs PID = 7.1 ppm
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-074	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.2/3			Collect geotech sample from 24.1-25.1' bgs PID = 44.8 ppm
25	25.2-25.6				Silty clay, CH, brown, wet, elastic	PID = 0.2 ppm
	25.6-25.8				Silty gravel, GM, grey, wet	
26	25.8-27				Till, silty clay, CL, grey, damp, stiff, trace gravel	
27					EOB @ 27' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-075	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.7/4		Silty clay topsoil fill, HF, dark brown, damp, medium soft	PID = 0.0 ppm
1	0.8-2.3				Silty clay and gravel fill, HF, orange-brown, damp, medium soft	PID = 0.0 ppm
2						
	2.3-3.4				Silty, clayey, sand and gravel fill, HF, brown to orange-brown, damp to moist	Collect geotech sample from 2.4-3.3' bgs PID = 0.0 ppm Collect soil sample from 2.4-2.8' bgs
3						
	3.4-5.9				Sand, SP, grey to light brown, wet, trace gravel; medium sands	PID = 0.0 ppm
4			2.9/4			
5						PID = 0.0 ppm
						Collect soil sample from 5.4-5.9' bgs PID = 0.0 ppm
6	5.9-6.6				Sand and gravel, GP, light brown, wet; gravel is subangular to well-rounded	Collect geotech sample from 5.9-6.9' bgs
	6.6-13.3				Sand, SP, light brown, wet, trace gravel; mediun sands, trace coarse sands	PID = 0.0 ppm
7						
8			2.7/4		Zone of gravel 8.3-8.4' bgs	PID = 0.0 ppm
9						
					Coarse sands 9.7-10.2' bgs	PID = 0.0 ppm
10						
						PID = 0.0 ppm
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-075	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.7/4		Coarse sand bedding at 12.1 to 12.3' bgs and 12.9' bgs	PID = 0.0 ppm
13	13.3-16.6				Sand, SP, light brown to grey/brown, wet, fine sands, trace gravel and coarse sands	PID = 0.0 ppm
14						
15						
16			2.8/4		Coarse sands from 16-16.6' bgs	PID = 0.0 ppm
	16.6-21.3				Silty sand, SM/SP, grey to grey-brown, wet, dense, silt laminations from 16.6-16.9' bgs are dark grey in color, sands are fine-grained; trace shell fragments	PID = 0.0 ppm
17						
18						
19						
20			3.1/4			
21	21.3-21.8				Sandy gravel, GP, grey-brown, wet; gravel is well-rounded and uniform in size	Took photograph; PID = 0.0 ppm
	21.8-24.4				Silty sand, SP/SM, grey/brown, wet; silt dark grey laminations start at 22.4' bgs; trace gravel and shell fragments	PID = 0.0 ppm Collect soil sample from 22.4-22.9' bgs
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-075	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	24.4-24.8		2.5/4		Silty sandy clay and gravel, GC, brown, wet	Collect geotech sample from 24-24.8' bgs
	24.8-28				Till, silty clay, CL, grey, dry, stiff; trace gravel throughout (~ 0.3' in diameter)	PID = 0.0 ppm
25						
26						
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-076	SHEET 1 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot, along North Guardrail
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.3' bgs START: 3/25/05 FINISH: 3/25/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4				Asphalt, silty, sandy gravel fill, HF, dark brown, dry	PID = 0.0 ppm
	0.4-0.9		3.2/4		Sandy, clay and gravel fill, HF, orange-brown, damp	Some sands may be of "foundry sand" origin PID = 0.0 ppm
1	0.9-2.3				Sand, SP, light brown, moist, loose; trace gravel; sands are coarse-grained	
2						∇ water table @ ~ 2.3' bgs
	2.3-4				Sand, SP, tan/brown, wet; sands are fine- to medium-grained	PID = 0.0 ppm
3						
						PID = 0.0 ppm
4	4-6		3.9/4		Sand and gravel, SP, light brown, wet; coarse-grained sands; gravel is subrounded to rounded	PID = 0.0 ppm
5						
6	6-8				Sand and gravel, SP, light grey to grey/brown, wet; sands are fine to medium with coarse sand/gravel lenses (6.9-7.1' bgs and 7.5-7.7' bgs)	PID = 0.0 ppm
7						
8	8-13.3		2.7/4		Sand, SP, grey/brown to grey, wet; trace gravel; sands are fine to medium with coarse sand/ gravel lenses at 8.6-8.7' bgs and coarse sands at 12.6-13.3' bgs	PID = 0.7 ppm PID = 4.8 ppm PID = 9.5 ppm PID = 7.9 ppm PID = 2.1 ppm
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER
186305.FI.01	SO-076 SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot, along North Guardrail
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.3' bgs START: 3/25/05 FINISH: 3/25/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4			PID = 15.3 ppm
13						PID = 2.1 ppm
	13.3-20.7				Silty sand, SM/SP grey/brown to grey, wet, fine sands; clay lens at 14.1-14.13' bgs; trace gravel	PID = 0.0 ppm
14						
15						
16			2.7/4			PID = 0.0 ppm
17						PID = 0.0 ppm
18						PID = 0.0 ppm
19						
20	20.7-20.9		3/4		Silty sand, SP/SM, grey/brown, wet; trace gravel; fine sands	
	20.9-21.3				Clayey, sandy, silt, ML, grey/brown, wet, laminations	
21	21.3-25				Silty sand, SP/SM, grey/brown, wet, trace gravel; fine sands, trace shell fragments	
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-076	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot, along North Guardrail
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.3' bgs START: 3/25/05 FINISH: 3/25/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4			
25	25-25.4				Sandy, silty gravel, GM, grey/brown, wet, shell fragments, some whole shells intact; gravel is subangular to subrounded	
	25.4-28				Silty clay, CL, brown, damp, stiff (till)	
26						
27						
28						
					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-077	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Larsen Marine, Southeast Corner of IO Service Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs START: 3/28/05 FINISH: 3/28/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.6		3.8/4		Asphalt, silty, sand and gravel fill, HF, light brown to black, dry, loose	PID = 0.0 ppm
	1.6-4				Sandy fill, HF, light brown to dark brown, damp to wet at ~ 2.8' bgs; sand is medium-grained	Collect geotech sample from 1.6-2.6' bgs Collect soil sample from 2.6-2.8' bgs PID = 0.0 ppm
1						
2						
3						
4	4-10.3		Liner stuck, could not determine recovery		Sand, SP, grey to light brown, wet, trace gravel; sand is medium-grained, trace gravel is subrounded to well-rounded	Collect soil sample from 4-6' bgs PID = 0.0 ppm
5						
6						
7						
8			3.5/4			PID = 0.0 ppm Collect geotech sample from 8.5-10' bgs
9						
10					Coarse sands from 10-10.3' bgs	PID = 0.0 ppm
	10.3-14				Sand, SP, grey to grey/brown, wet; fine to medium-grained sands	
11						
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-077	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Larsen Marine, Southeast Corner of IO Service Building
ELEVATION: — DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs — START: 3/28/05 — FINISH: 3/28/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.1/4			PID = 0.0 ppm
13						
14	14-16.2				Sand, SP, dark grey, wet; medium sands, trace coarse sands, trace gravel	"Organic" odor PID = 0.0 ppm
15						
16	16.2-25.3		2.8/4		Silty sand, SP/SM, dark grey, wet; trace gravel; sand is medium to fine-grained, dense	PID = 0.0 ppm
17						
18						PID = 0.0 ppm
19						
20			2.7/4			PID = 1.6 ppm
21						PID = 3.6 ppm
22						PID = 3.2 ppm
23						PID = 3.9 ppm
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-077	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: Larsen Marine, Southeast Corner of IO Service Building
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs START: 3/28/05 FINISH: 3/28/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			PID = 1.3 ppm Collect soil sample from 24-24.3' bgs Collect geotech sample from 24.3-35.3' bgs
25	25.3-28				Silty clay till, CL, light brown, dry, stiff	
26						
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-078	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Outside SW Corner of Hallway to HAZMAT Storage Area

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 0.6' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.1/4		Sandy, silt and gravel fill, HF, light tan to grey, damp	PID = 1.3 ppm; collect soil sample from 0-0.6' bgs; ∇ water table @ ~ 0.6' bgs
	0.6-1				Sand and gravel fill, HF, black, wet; possible foundry sand	PID = 0.0 ppm
1	1-1.4				Sand and gravel fill, HF, tan to grey, wet	PID = 0.0 ppm
	1.4-4				Sand, SP, brown to grey, wet; medium sands	Collect geotech sample from 1.5-2.5' bgs Collect soil sample from 2.5-3.1' bgs
2						
3						
4	4-5.1		Could not determine, liner stuck in sampling tube		Sand and gravel, SP, brown to grey-brown, wet; medium to coarse sands; gravel is flat and well-rounded; trace silt	"Sheen" on tube when pulled up from subsurface Odor similar to diesel fuel; PID = 0.0 ppm
5	5.1-10.4				Sand, SP, brown to grey/brown, wet; trace gravel; fine to coarse sands, but predominantly medium	PID = 0.0 ppm
6						
7						
8			3.1/4			
9						
10					Coarse sands from 10.2-10.4' bgs	
	10.4-14.3				Sand, SP, brown to grey/brown, wet; trace gravel, fine to medium sands; trace coarse sands; (sand with gravel from 10.8-10.9' bgs	
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-078	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: Outside SW Corner of Hallway to HAZMAT Storage Area
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 0.6' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4		Coarse sands from 12.1-12.3' bgs and 13.3-14.3' bgs	PID = 0.0 ppm
13						
14						
	14.3-20				Sand, SP, brown, wet; very fine to medium sands; trace silt	
15						
16						
			1.1/4			Collect geotech sample from 16.1-17.1' bgs PID = 0.0 ppm
17						
18					Refusal at ~ 18' bgs; offset ~ 5' to southeast	Wood in sampler shoe; will offset to continue sampling
19						
20						
	20-20.3		1.9/2		Silty sand and gravel, SP/GM, brown/grey, wet	Collect soil sample from 20-20.7' bgs
	20.3-20.7				Silty, sandy, gravel, GM, brown/grey, wet	PID = 0.0 ppm
	20.7-22				Silty clay till, CL, brown, dry; trace gravel from 20.7-21' bgs	
21						
22						
					EOB @ 22' bgs (refusal)	
23						
24						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-079	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.6/4		Topsoil fill, HF, dark brown, damp	PID = 0.0 ppm
	0.5-1.4				Silty clay and gravel fill, HF, orange-brown, damp	PID = 0.0 ppm
1						
	1.4-6				Sand, SP, grey/brown to brown, damp to wet at 2.7' bgs; trace gravel, sands are medium with some coarse sand intervals	Collect geotech sample from 1.6-2.6' bgs Collect soil sample from 1.4-2.7' bgs
2						PID = 0.2 ppm ∇ water table @ ~ 2.7' bgs Collect soil sample from 2.7-3.6' bgs
3						PID = 1.8 ppm
4			3.3/4			
						PID = 1.7 ppm Collect geotech from 4.5-6' bgs
5						
6	6-6.4				Sand and gravel, SP/GP, brown, wet, gravel is subangular and rounded; sand is medium-grained; gravel up to 0.1' in diameter	
	6.4-14.1				Sand, SP, brown, wet, trace gravel; medium sands; trace coarse sands	
7						PID = 3.5 ppm
8			3.1/4		Coarse sands 8-8.5' bgs	PID = 8.2 ppm
9						PID = 24.5 ppm
10						PID = 28.7 ppm
11						PID = 53.5 ppm
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-079	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			PID = 24.7 ppm
13						Odor similar to "solvent"
14	14.1-18.5				Sand, SP, grey/brown, wet; fine sands; trace silt trace shell fragments and coarse sands; some shells are fully intact	PID = 50.5 ppm
15						
16			2.8/4			PID = 67.1 ppm
17						PID = 91.0 ppm
18					Trace coarse sand, gravel, and shell fragments 17.7 to 17.73' bgs	PID = 100.8 ppm
19	18.5-20.6				Sand, SP, grey to grey-brown, wet; sands are fine- to coarse-grained; shell fragments throughout	Odor similar to "solvent" PID = 48.5 ppm
20			2.5/4			PID = 32.4 ppm
21	20.6-21.7				Sand, SP, brown, wet; sands are medium- to coarse-grained; coarse sands and gravel 21.2-21.5' bgs; clayey sands 20.3-20.4' bgs	Collect geotech sample from 20.6-21.6' bgs PID = 53.6 ppm
22	21.7-24.9				Silty sand, SP/SM, grey, wet; trace clay near bottom of interval	PID = 48.4 ppm
23						
24						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-079	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.8/2.5			Collect soil sample from 24-24.9' bgs
	24.9-25.2				Silty clay, CL/ML, brown, wet, soft	PID = 3.8 ppm
25						
	25.2-25.4				Silty, sandy, gravel and clay, GM/GC, grey/brown, wet; clay has high plasticity (CH), soft to very soft	PID = 2.6 ppm
	25.4-26.5				Silty clay till, CL, brown, dry, stiff	
26						
					EOB @ 26.5' bgs (refusal)	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-080	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: NW Corner of New Die Cast Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.8' bgs START: 3/30/05 FINISH: 3/30/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		2.9/4		Silty, sandy clay and gravel fill, HF, brown, dry, loose	
	0.7-4.8				Sand fill, HF, light brown, dry; trace gravel; trace clay; medium sands	PID = 0.0 ppm
1						Collect geotech sample from 1-2.5' bgs
2						PID = 0.0 ppm
3						Collect soil sample from 2.5-2.9' bgs
4			3.1/4			
5	4.8-16				Sand, SP, brown, damp to wet at 5.8' bgs; fine to coarse sands; trace gravel	PID = 0.0 ppm
6						Collect soil sample from 5.8-7.1' bgs
7						
8			2.8/4		Coarse sands and gravel from 8.4-8.5' bgs	PID = 0.0 ppm Collect soil sample from 8-9.7' bgs
9						
10						
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-080	SHEET 2 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: NW Corner of New Die Cast Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.8' bgs START: 3/30/05 FINISH: 3/30/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.3/4			
13						
					Coarse sands and gravel from 13.5-16' bgs	PID = 0.0 ppm
14						
15						
16	16-18.5		2.7/4		Sand, SP, grey/brown, wet; fine sands, trace coarse sands, trace shell fragments	PID = 0.0 ppm Odor similar to "burnt oil"
					Coarse sands, trace gravel and shell fragments from 16.2-16.4' bgs; gravel is well rounded	
17						
18						PID = 0.0 ppm
	18.5-21.7				Silty sand, SP/SM, grey to grey/brown, wet; fine sands, trace shell fragments	PID = 0.0 ppm Odor similar to "burnt oil"
19						
20			2.5/4			
21						
	21.1-21.4				Silty sandy clay, CL/SC, grey-brown, wet	PID = 0.0 ppm
	21.4-30.5				Silty sand, SP/SM, grey to grey/brown, wet; fine sands, trace shell fragments	PID = 0.0 ppm
22						
23						
24						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-080	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: NW Corner of New Die Cast Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.8' bgs START: 3/30/05 FINISH: 3/30/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			Could not determine, liner stuck in sampler			PID = 0.0 ppm Odor similar to "burnt oil"
25						
26						
27						
28			2.6/4			Collect soil sample from 28-29' bgs
29						Collect geotech sample from 29-30.4' bgs
30						
	30.5-30.6				Silty, sandy gravel, GM, grey, wet; gravel is subangular	PID = 0.0 ppm
31	30-6-32				Silty clay till, CL, grey	PID = 0.0 ppm
32						
					EOB @ 32' bgs (refusal)	
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-081	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Solvent Vapor Degreaser/MIP-085

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 4.9' bgs START: 3/30/05 FINISH: 3/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.4		1.9/4		Silty, sandy clay and gravel fill, HF, orange-brown to dark brown, dry; fine to medium sands	PID = 0.0 ppm Collect geotech sample from 0.3-1.4' bgs
1						
	1.4-4.4				Silty sand and gravel fill, HF, light brown, dry to wet; medium to coarse sands; trace clay and red brick fragments, loose	
2						PID = 0.0 ppm
3						
4						
	4.4-8.7		1.7/4		Silty, sandy clay and gravel fill, HF, dark brown, wet; trace red brick and possible slag/foundry sand materials; "oily throughout"; trace glass; subangular to angular gravel	PID = 0.0 ppm ∇ water table @ ~ 4.9' bgs "Oily"; "burnt oil" odor
5						Collect soil sample from 4-4.9' bgs PID = 0.0 ppm
6						
7						
8			2.9/4			Collect soil sample from 8-8.7' bgs Very "oily" at top of interval (~ 8' bgs)
	8.7-9.5				Sand, SP, black/brown, wet; fine to medium sands, trace coarse sands	PID = 0.0 ppm
9						
	9.5-12				Sand and gravel, SP/GP, light brown, wet; medium to coarse sands	
10						Collect geotech sample from 9.9-10.9' bgs PID = 0.0 ppm Less "oily"
11						
12						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-081	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Solvent Vapor Degreaser/MIP-085
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 4.9' bgs START: 3/30/05 FINISH: 3/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-16		2.8/4		Sand, SP, brown to grey/brown, wet; fine to medium sands, trace coarse sands, trace gravel (subrounded)	PID = 2.6 ppm
13						PID = 2.4 ppm
14						PID = 1.8 ppm
15						
16	16-24		2.8/4		Silty sand, SP/SM, grey/brown, wet; sands are fine-grained with trace medium and coarse sands; trace shell fragments and gravel (rounded) coarse sands and shell fragments 16.7-16.8' bgs	PID = 10.9 ppm PID = 16.7 ppm PID = 23.3 ppm PID = 16.9 ppm PID = 30.6 ppm PID = 44.9 ppm
17						
18						
19						
20			1.3/4			PID = 25.5 ppm
21						
22						
23						
24						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-081	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS   LOCATION: Near Solvent Vapor Degreaser/MIP-085
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 4.9' bgs   START: 3/30/05   FINISH: 3/31/05   LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	24-24.3		2.9/4		Sand and gravel, SP/GP, dark grey, wet; sands are coarse grained; shell fragments throughout	Collect geotech sample from 24-25' bgs Strong "solvent" odor
	24.3-28				Silty sand, SP, grey/brown, wet; sands are fine grained; trace gravel (rounded)	
25						Collect soil sample from 25-26' bgs
26						PID > 9,576 ppm; "out of range"
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-082	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Old Die Cast Area/MIP-029
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 6.1' bgs START: 3/30/05 FINISH: 3/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-6			1.9/4	Silty sand and gravel fill, HF, brown to orange/ brown, dry to damp at 1.4' bgs; gravel is angular to subangular; possible slag at 1.3-1.6' bgs	PID = 0.0 ppm
1						
2						PID = 0.0 ppm
3						
4			2.3/4			Collect soil sample from 4-5' bgs PID = 0.0 ppm
5						Collect geotech sample from 5-6' bgs
6	6-8				Sand, SP, light brown, damp to wet at 6.1' bgs; medium to fine sands	Odor similar to "burnt oil" PID = 0.0 ppm
7						
8	8-13.3		1.9/4		Sand, SP, grey/brown, wet; medium sands; trace gravel	PID = 0.0 ppm Collect soil sample from 8-8.8' bgs Collect geotech sample from 8.8-9.8' bgs Odor similar to "burnt oil" PID = 0.0 ppm
9						
10						
11						
12						

CH2MHILL

PROJECT NUMBER	BORING NUMBER	
186305.FI.01	SO-082	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Old Die Cast Area/MIP-029
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 6.1' bgs START: 3/30/05 FINISH: 3/31/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			
13	13.3-17.3				Sand, SP, grey-brown, wet; fine sands; trace gravel	PID = 0.0 ppm 3/30/05: lost sampler down borehole
14						PID = 0.0 ppm
15						
16			2.7/4			PID = 0.0 ppm Collect geotech sample from 16-17.3' bgs
17	17.3-20				Silty sand, SP/SM, grey to grey/brown, wet	PID = 0.0 ppm Collect soil sample from 17.3-18.7' bgs
18						
19						
20			Unable to determine; lost sampler		N/A	Lost sampler down borehole
21						
22						
23						
24					EOB @ 23.5' bgs (refusal)	

Indoor Air and Soil Gas Sampling
OMC Plant 2 (Operable Unit 4), Waukegan, Illinois
WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR: Kevin Adler/USEPA

PREPARED BY: CH2M HILL

DATE: October 13, 2005

Introduction

This memorandum documents the indoor air and soil gas sampling activities conducted as part of the Remedial Investigation (RI) at the Outboard Marine Corporation (OMC) Plant 2 site in Waukegan, Illinois. The samples were collected on February 23, 2005, at select offsite locations on the Larsen Marine property, a commercial business located south of Seahorse Drive.

Elevated groundwater concentrations of chlorinated volatile organic compounds (CVOCs) have been detected beneath OMC Plant 2. The groundwater data indicate a CVOC plume may be migrating to the south toward Larsen Marine and Waukegan Harbor. Samples of indoor air and soil gas were collected on the Larsen Marine property in order to determine if volatilization of CVOCs from groundwater could result in inhalation exposures.

This memorandum includes the following:

- Description of specific field activities performed including locations and sampling methodology
- A summary of the samples collected

Equipment and Materials

Indoor air and soil gas samples were collected in SUMMA canisters set up onsite immediately before the start of sampling. The samples were analyzed using USEPA Method TO-15 for volatile organic compounds (VOCs) in air. Severn Trent Laboratories of Colchester, Vermont, supplied the canisters and flow controllers, and performed the analyses.

Flow controllers used for indoor air samples were the “non-variable” type which provided a fixed flow rate to achieve a sample time of approximately 8 hours. Soil gas samples were instantaneous grab samples collected without flow controllers.

Indoor Air Sampling

Sample Locations

A total of four indoor air samples and one background sample were collected at the Larsen Marine property. The Field Sampling Plan proposed that samples be collected from within each of the main buildings on the Larsen Marine property. A reconnaissance of the buildings was conducted prior to sampling to identify the buildings with VOC-generating activities such as painting or degreasing, or without visible defects in the floor where soil gas intrusion could occur. Based on the site reconnaissance, the "I/O" Building and Building "H" were selected because visible defects were observed in the floor, and there were no odors or activities indicative of potential compromises to air quality (Figure 1). The sample locations included:

- Three samples from locations in the "I/O" Building (Figure 2)
- One sample from Building "H" (Figure 3)
- One background sample was located outdoors about 75 feet southwest of Building "C," which was upwind of the study area at the start of the sampling (Figure 4)

The "I/O" Building

The "I/O" Building, which measures approximately 90 feet by 140 feet, is used primarily for boat storage. Two samples, OMC-AA001 and OMC-AA003, were collected from cracks in the floor in the center isle of the building (see Figure 2). Since the building also contained two diesel powered fork lifts, a gasoline powered snow blower (in the southwest corner), and two aboveground diesel fuel storage tanks (in the southeast corner), a third sample, OMC-AA002, was collected at a height of about 5 feet above the floor to help assess ambient sources apart from possible intrusion points. The building is not well sealed and there are large sliding doors on the southern wall that were closed during sampling. There were no repair or maintenance activities conducted in the building during the sample period.

Building "H"

Building "H," which measures approximately 30 feet by 90 feet, is also used for boat storage. One sample, OMC-AA004, was collected from a crack in the floor in the central interior of the building (Figure 3). The building is not well sealed and there are large sliding doors on the southern wall that were closed during sampling. There were no apparent sources of potential contamination observed and there were no repair or maintenance activities conducted in the building during the sample period.

Procedures

Setup for a typical indoor air sample included removal of the protective end-cap from the inlet port, installation of a flow controller and particulate filter, reinstallation of the protective end-cap over the flow controller, and opening/closing the canister valve to obtain an initial vacuum reading. This reading was compared to the reading reported by the laboratory before shipment to the site. After transporting the canister to the sample site, the protective end cap was removed, a small section of fresh Teflon® tubing was attached to the inlet port, the open end of the tubing was placed in position, and the valve was opened. After sampling was completed, a final vacuum reading was obtained, the valve was closed, the flow controller and filter were removed, and the canister was sealed with a protective end-cap.

Soil Gas Sampling

Sample Locations

Five soil gas locations were selected, based on the results from previous investigations and the Membrane Interface Probe investigation, to provide spatial coverage across the ground-water plume beneath the Larsen Marine property. The sample locations include:

- OMC-GS001 was collected approximately 20 feet from Building 5 in the second vehicle parking space from east along the southern portion of Building "H."
- OMC-GS002 was collected near the painted line between the third and forth boat storage spaces east of Building "I" near the vehicle parking area.
- OMC-GS003 was collected roughly 200 feet east of OMC-GS002 in the boat storage area near vehicle parking, northeast and across the road from the eastern corner of the "I/O" Building.
- OMC-GS004 was collected between Building "C" and the main showroom/customer service building.
- OMC-GS005 was collected near the southeast corner of the "I/O" Building.

Procedures

Soil gas samples were collected from above the water table using direct push techniques. With the sample probe driven to the appropriate depth above groundwater, the SUMMA canister assembly was fitted with a section of Teflon® tubing and attached to the end-nut fitting on the Geoprobe® section, and the valve was opened to collect the sample. New sections of Teflon® tubing were used at each sample location to prevent cross-contamination. Leak checks, as well as a system purge, were conducted before soil gas sample collection. Sampling was at a flow rate of between 100 to 200 milliliters/min and terminated when the canister vacuum reached approximately 3–5 in/Hg.

Reference

CH2M HILL. 2004. *Field Sampling Plan, OMC Plant 2, Waukegan, Illinois, Final*. November.

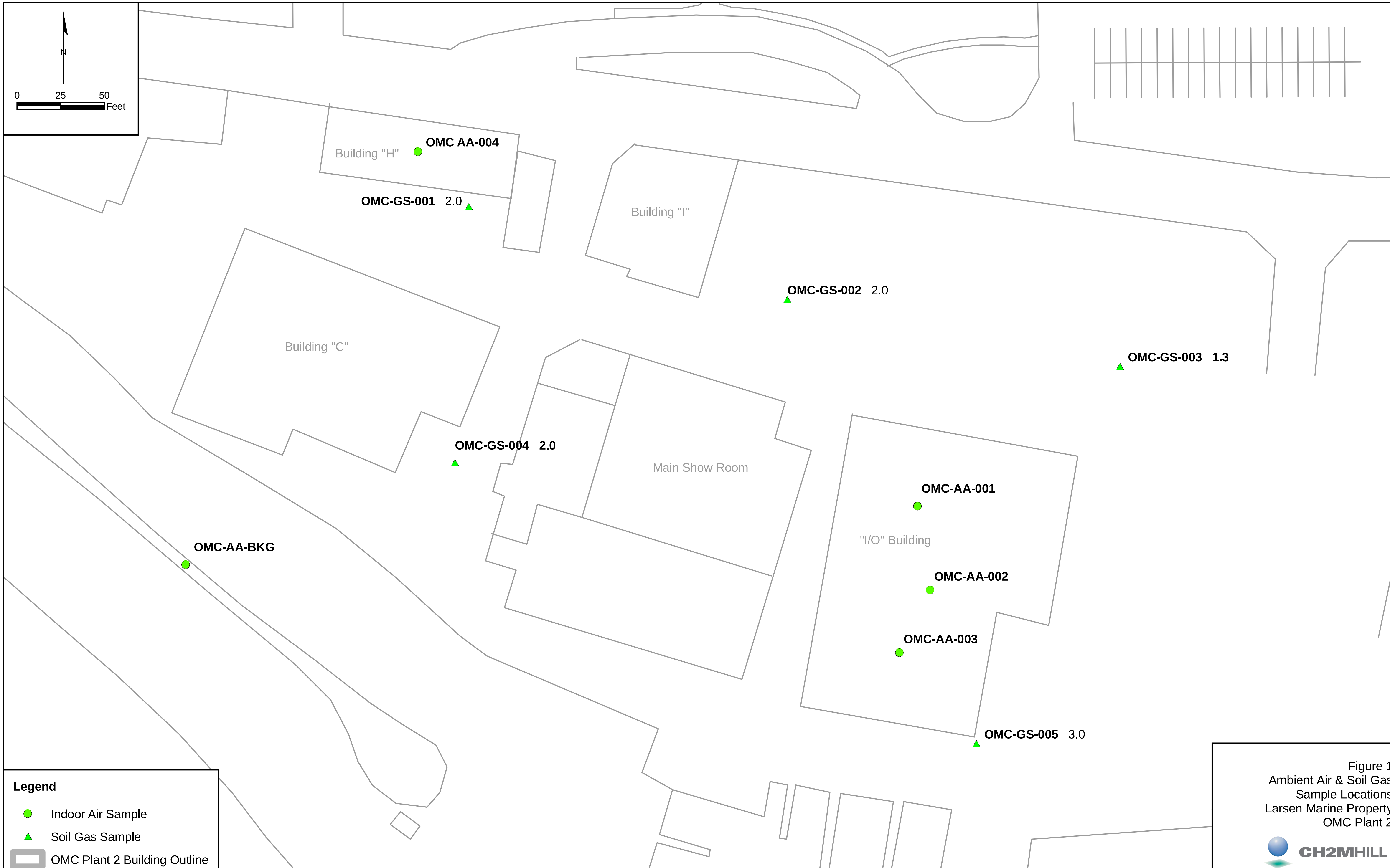
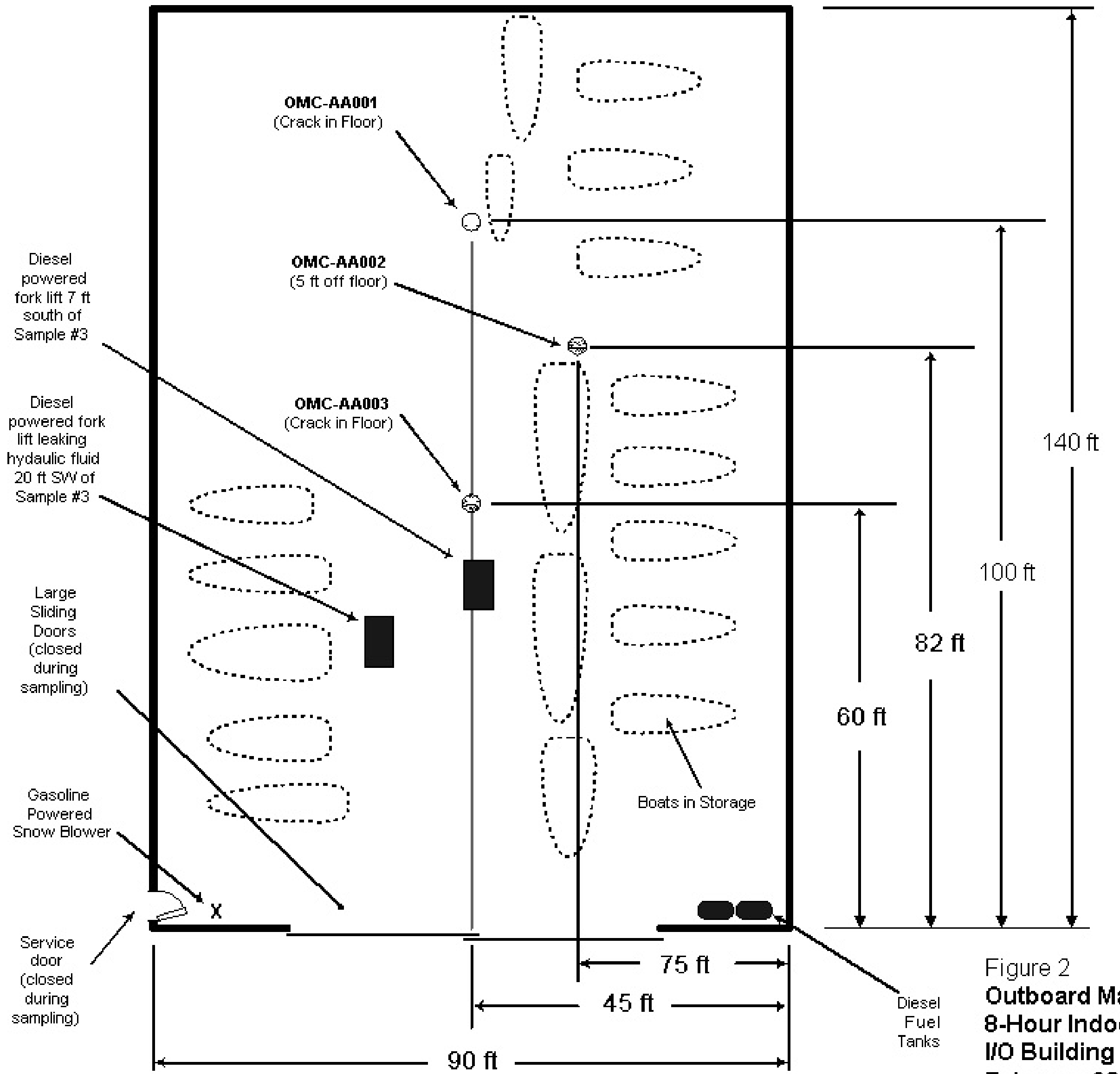


Figure 1
Ambient Air & Soil Gas
Sample Locations
Larsen Marine Property
OMC Plant 2

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\September05\Report\Figure01_Tech_Memo_Ambient_Marine_Soil_Gas_locs.mxd, Date: October 12, 2005 3:57:00 PM, User: JHANSEN1



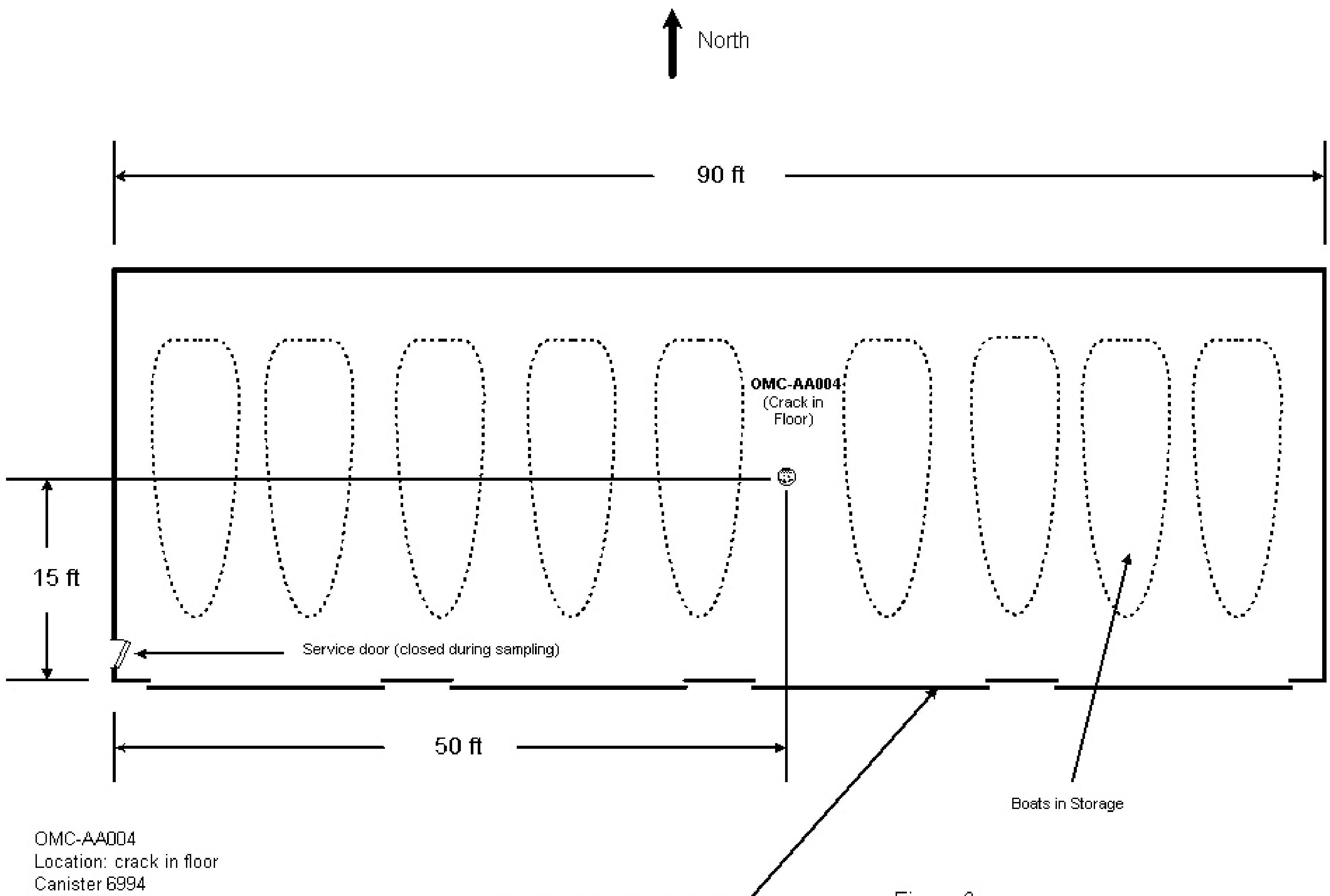
North

OMC-AA001
Location: crack in floor
Canister 6323
Begin: 09:00
End: 16:45
Inirtial Vac. 28 in. Hg
Final Vac. 5.5 in. Hg

OMC-AA002
Location: ~5 ft. above floor
Canister 6455
Begin: 09:01
End: 16:44
Inirtial Vac. 28 in. Hg
Final Vac. 3 in. Hg
(above floor ~ 5 ft)

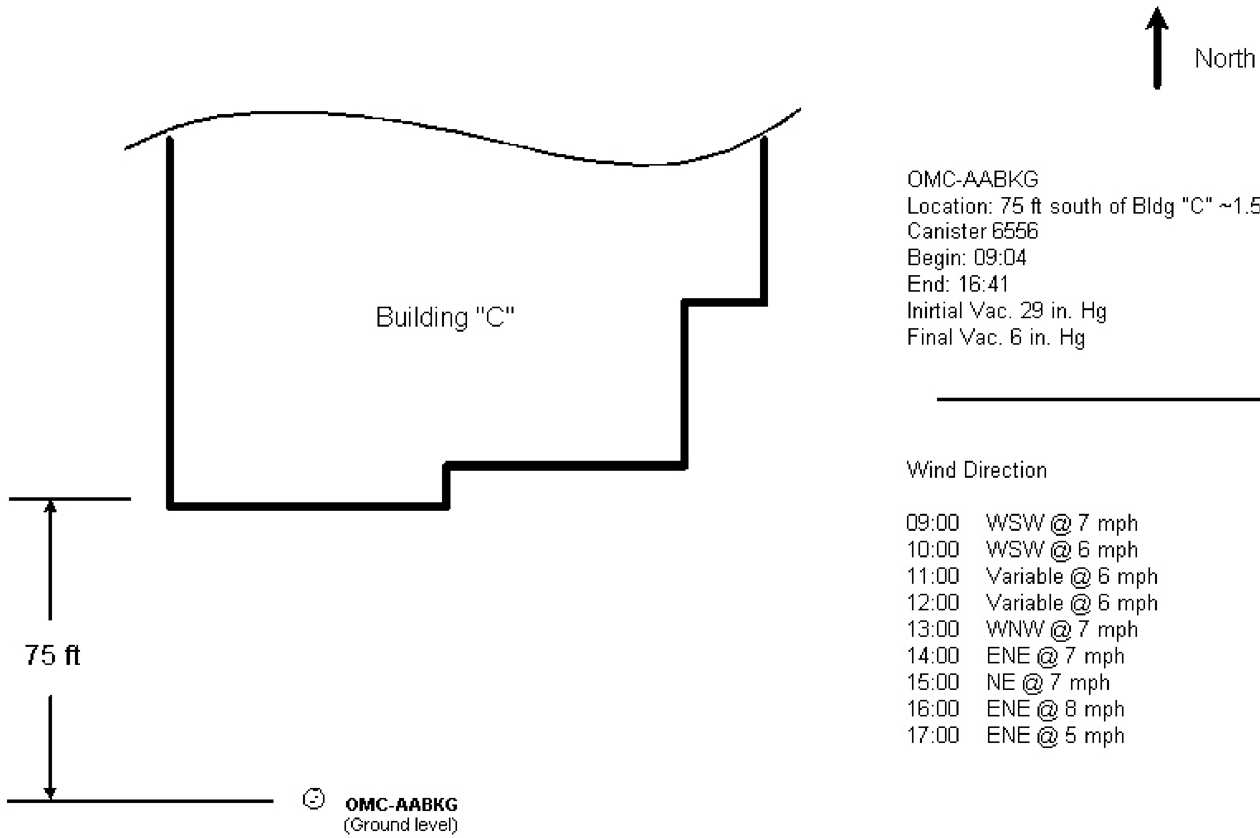
OMC-AA003
Location: crack in floor
Canister 6351
Begin: 09:02
End: 16:43
Inirtial Vac. 32 in. Hg
Final Vac. 7 in. Hg

Figure 2
Outboard Marine Corporation
8-Hour Indoor Air Study - Larsen Marina
I/O Building
February 23, 2005



OMC-AA004
Location: crack in floor
Canister 6994
Begin: 09:07
End: 16:38
Inirtial Vac. 29 in. Hg
Final Vac. 3 in. Hg

Figure 3
Outboard Marine Corporation
8-Hour Indoor Air Study - Larsen Marina
"H" Building
February 23, 2005



OMC-AABKG
Location: 75 ft south of Bldg "C" ~1.5 ft. above ground
Canister 6556
Begin: 09:04
End: 16:41
Inirtial Vac. 29 in. Hg
Final Vac. 6 in. Hg

Wind Direction

09:00	WSW @ 7 mph
10:00	WSW @ 6 mph
11:00	Variable @ 6 mph
12:00	Variable @ 6 mph
13:00	WNW @ 7 mph
14:00	ENE @ 7 mph
15:00	NE @ 7 mph
16:00	ENE @ 8 mph
17:00	ENE @ 5 mph

Figure 4
Outboard Marine Corporation
8-Hour Indoor Air Study - Larsen Marina
Outdoor Background Sample
February 23, 2005

Hydrogeologic Investigation OMC Plant 2 (Operable Unit 4), Waukegan, Illinois—WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR:	USEPA
PREPARED BY:	CH2M HILL
DATE:	October 13, 2005

Introduction

This memorandum documents the activities associated with the hydrogeologic investigation conducted as part of the remedial investigation (RI) at the Outboard Marine Corporation Plant 2 (OMC Plant 2) in Waukegan, Illinois. The investigation activities included installation and development of monitoring wells, abandonment of monitoring wells and temporary piezometers, measurement of groundwater levels, and groundwater sampling. In situ hydraulic testing of the newly installed wells was also conducted and is described in a separate memorandum. The hydrogeologic investigation was conducted between March 15 and May 6, 2005.

This memorandum includes the following:

- Description of field activities performed including locations, methods, and deviations from site-specific plans
- Summary of sample locations, depths, field measurements, and observations
- Boring logs and well construction diagrams have been included as Attachments 1 and 2, respectively

Field Activities

The field activities conducted and their specific objectives, as discussed in the *Field Sampling Plan* (FSP) (CH2M HILL, 2005), included:

- Installation of monitoring well nests at 18 locations to fill gaps in the existing well network. The wells will be used to monitor shallow and deep groundwater flow and quality across the Plant 2 site and to monitor groundwater potentially discharging to Lake Michigan and/or Waukegan Harbor.

- Installation of five monitoring well nests within the building to monitor the potential source areas and the groundwater plume.

- Development of existing and newly installed monitoring wells prior to groundwater sampling.

- Abandonment of selected monitoring wells and piezometers based on well construction and deterioration.
- Collection of groundwater samples from new and existing monitoring well locations to verify current groundwater quality conditions.
- Measurement of groundwater levels from new and existing monitoring well locations to verify current groundwater flow directions and rates.

Monitoring Well Installation

Locations

This activity included the installation of 18 monitoring well nests (13 outside the plant and 5 within the plant) by Innovative Probing Solutions (IPS) of Mt. Vernon, Illinois. Each location consists of a well nest including a shallow zone (0 to 10 feet) and a deep zone (20 to 30 feet) well. The locations of the new and existing monitoring wells are presented in Figure 1.

A total of 10 monitoring locations outside the building were initially identified in the FSP. The proposed locations for these new wells were reexamined and modified based on the results of the Membrane Interface Probe (MIP) investigation and preliminary groundwater analytical data. The modifications to the proposed monitoring well locations are as follows:

- A monitoring well nest was proposed to examine elevated VOC concentrations measured in a deep-zone temporary piezometer in 1997 (25,019 µg/L), located in the northwest portion of site. The proposed new well location was west of the railroad on the City of Waukegan property. Based on potential access issues and because the site was a former coal gasification plant, the results of the MIPs investigation were examined to determine the need for this monitoring well location. The MIPs results did not confirm the high groundwater concentrations in this area and the well nest was relocated.
- Based on the MIPs results, a monitoring well nest (MW-513) was added south of the plant in the grassed area of the southwestern corner of the Corporate Building. The well nest was located to monitor groundwater flow and contaminant concentrations potentially migrating toward the Larsen Marine property.
- An additional monitoring well nest location (MW-517) was installed near the former HAZMAT Storage area to aid in sampling and groundwater flow direction determination in the southwest corner of the site.
- Two additional nested locations (MW-500 and MW-501) were completed as replacement monitoring wells for locations W-2A, W-2B, W-2C and W-4A, W-4B, and W-4C.

Well Installation

Prior to monitoring well installation, soil samples at each location were continuously sampled from ground surface to the top of the till, as indicated by direct-push refusal. The direct-push sampling methodology is described in the technical memorandum entitled *Soil and Sediment Investigations* (CH2M HILL, 2005). Soil samples were collected using a

Geoprobe® Macrocore sampler. The soil samples were logged using the ASTM D-2487, Unified Soil Classification System and were screened for organic vapors using a photoionization detector. In addition, soil samples from the screened intervals were collected and submitted to CT Laboratories to be analyzed for total organic carbon, grain-size, porosity, and bulk density. The soil boring logs are provided in Attachment 1.

The shallow and deep monitoring wells were installed using a 4.25-inch inside diameter (ID) hollow-stem auger method in accordance with the FSP. The monitoring well information is summarized in Table 1 and the completion diagrams are provided in Attachment 2.

The shallow monitoring wells are screened in overlying unconsolidated material and range from 7 to 9.5 feet in depth. As drilling commenced, it became apparent that construction of the shallow wells would need to be modified. With groundwater in close proximity to ground surface (on the order of 0.5 to 6 feet bgs), the ability to place the well screen across the water table and the installation of an adequate thickness of annular and surface seal could not be accomplished as planned. In some cases, the thickness of the sand filter pack above the screen and/or the bentonite seal was reduced from the minimum thickness specified in the FSP. The constructions of the following wells were adjusted:

- MW-500S, MW-501S, MW-503S, MW-507S, and MW-508S annular seals were 0.5 foot thick
- MW-502S and MW-509S annular seals were 1.0 foot thick
- MW-512S, MW-513S, MW-514S, MW-516S, and MW-517S annular seals were 1.5 feet thick

The deep monitoring wells were screened in overlying unconsolidated material above the till at depths ranging from 20 to 29.5 feet below ground surface (bgs). The deep monitoring wells were also constructed of 2-inch ID, schedule 40 polyvinyl chloride (PVC) casing and a 5-foot screened interval (0.010-inch machine slotted). The deep wells were built in accordance with the FSP, with the exception of MW-507D. The filter pack in MW-507D extends to 5 feet above the top of the screen, rather than the required 2 feet, because of subcontractor measurement error.

Monitoring Well Development

All new shallow and deep monitoring wells and existing monitoring wells that were identified for groundwater sampling were developed/redeveloped (Table 2) to remove fine-grained materials that may have settled in and around the well screen during installation, and to maximize the ability of the well to transmit representative portions of groundwater.

Well development was completed using a low-yield submersible pump connected to a 1-inch, Schedule 40 PVC pipe and discharge hose. Development was accomplished by surging the well screen with a submersible pump connected to the PVC pipe, followed by purging the suspended sediments. Water quality parameters such as pH, temperature, and specific conductance were periodically monitored during development to assess stabilization of these parameters. Well development continued until the well yielded relatively sediment-free water and/or the monitored water parameters had stabilized. A well development record was maintained by the onsite hydrogeologist to document the well development methods used, the estimated volume of water purged, and the results of the water quality parameters monitored. The final measured water quality parameters are presented in Table 3.

Water quality parameters were not collected during the development of previously existing wells. The development of these wells was continued until the well yielded relatively sediment-free water.

Water quality parameters were not recorded for monitoring wells MW-508S and MW-510S because of the low well yield. Both monitoring wells were purged dry three times during development.

Fluids generated during well development activities were contained in labeled, 55-gallon drums staged as designated in the *Investigation-Derived Waste Management Plan* (CH2M HILL, 2004) or a designated truck-mounted poly tank. Development water was subsequently transferred into bulk storage poly tanks. Equipment used during well development was decontaminated between monitoring well locations in accordance with FOP-17, *Decontamination of Drilling Rigs and Equipment*.

Monitoring Well Abandonment

During the site reconnaissance that took place prior to groundwater sampling, the wells existing on the site were inspected to determine their suitability for groundwater sampling. Fourteen select monitoring wells and temporary piezometers were abandoned based on their deteriorated condition (Table 4).

Monitoring wells W-2A, W-2B, W-2C, W4A, W4B, W-4C, and W-14-JRB were abandoned because of deterioration. Piezometers MW-T101, MW-T104, MW-T105, MW-T107, TP-1, TP-10, and TP-11 were abandoned because of their well construction and potential for contamination to the underlying aquifer. All monitoring wells and piezometers were abandoned by removing as much of the casing as possible, ensuring a depth of at least 4 feet bgs, and then backfilling the boring with bentonite slurry or bentonite chips, based on the total depth of the monitoring well to be abandoned.

Water Level Measurements

Groundwater measurements were collected from all newly constructed and existing monitoring wells having similar well construction and depth. Results of the water level measurements are found in Table 1.

Groundwater Sampling

Upon development of the wells, groundwater sampling was conducted using low-flow methods as described in the FSP and in accordance with procedures outlined in the *Ground-water Sampling Guidelines for Superfund and RCRA Project Managers* (USEPA, 2002).

Groundwater was sampled from 21 of the existing 2-inch monitoring wells (including 6 shallow (0- to 10-foot) wells, 6 intermediate (10- to 20-foot) wells, and 11 deep (20- to 30-foot) wells), and 36 newly installed monitoring wells.

A GeoPump™ peristaltic pump with 0.25-inch ID Teflon®-lined tubing was used for low-flow purging and sampling of monitoring wells. Field parameters, including depth to water, pH, specific conductance, conductivity, temperature, dissolved oxygen, and turbidity, were measured at 5-minute intervals using a YSI 6920 equipped with a flow-through cell. The flow rate was also measured at 5-minute intervals using a graduated cylinder. Groundwater samples were collected when field parameter readings had stabilized. Field parameter stabilization was determined using guidelines presented in USEPA publication, *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers (2002).* A summary of the final field parameters is presented in Table 5.

Groundwater samples, including trip blanks, equipment blanks, duplicates, and matrix spike/matrix spike duplicate samples, were submitted to an analytical laboratory in USEPA's Contract Laboratory Program (CLP) to be analyzed for total and dissolved metals and cyanide, volatile organic compounds, semivolatile organic compounds, and polychlorinated biphenyls. Groundwater samples were also submitted to CT Laboratories in Baraboo, Wisconsin, to be analyzed for alkalinity, chloride, ethane, ethane, nitrate, nitrite, sulfate, sulfide, and total organic compounds.

References

ASTM Method D-5784-95.

CH2M HILL. 2004. *Field Sampling Plan, OMC Plant 2*. November.

CH2M HILL. 2004. *Investigation-Derived Waste Management Plan*. September.

CH2M HILL. 2005. Technical Memorandum: Soil and Sediment Investigations. May.

USEPA. 2002. *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers.* Ground Water Forum Issue Paper by Douglas Yeskis and Bernard Zavalam. May.

TABLE 1
Well Data and Groundwater Elevation Table May 2005
OMC Plant 2

Location	Top of Casing Elevation (ft amsl)	Elevation Ground Surface (ft amsl)	Top of Screened Interval (ft bgs)	Bottom of Screened Interval (ft bgs)	Top of Screened Interval (ft amsl)	Bottom of Screened Interval (ft amsl)	Screen Midpoint Elevation (ft amsl)	Distance between Screen Midpoints	May 2005 Depth to Water (btoc)	May 2005 Total Depth (btoc)	May 2005 GW Elevation (ft amsl)	May 2005 vertical gradient*	Aquifer
MW-500D	586.19	583.65	20.50	25.50	563.15	558.15	560.65		4.02	27.12	582.17		Deep
MW-500S	586.18	583.71	1.50	6.50	582.21	577.21	579.71	19.06	4.03	9.07	582.15	0.001	Shallow
MW-501D	585.76	583.29	23.00	28.00	560.29	555.29	557.79		5.21	31.27	580.55		Deep
MW-501S	585.83	583.36	1.50	6.50	581.86	576.86	579.36	21.57	5.23	10.22	580.60	-0.002	Shallow
MW-502D	587.33	584.84	18.00	23.00	566.84	561.84	564.34		4.70	25.84	582.63		Deep
MW-502S	587.44	584.93	2.00	7.00	582.93	577.93	580.43	16.09	4.79	9.87	582.65	-0.001	Shallow
MW-503D	584.63	584.86	20.00	25.00	564.86	559.86	562.36		2.40	23.89	582.23		Deep
MW-503S	584.66	584.91	2.00	7.00	582.91	577.91	580.41	18.05	2.41	7.33	582.25	-0.001	Shallow
MW-504D	588.16	588.42	24.00	29.00	564.42	559.42	561.92		6.16	28.50	582.00		Deep
MW-504S	588.23	588.42	4.00	9.00	584.42	579.42	581.92	20.00	6.22	9.41	582.01	-0.0005	Shallow
MW-505D	587.97	588.36	22.00	27.00	566.36	561.36	563.86		5.52	25.42	582.45		Deep
MW-505S	588.13	588.36	4.00	9.00	584.36	579.36	581.86	18.00	5.68	8.78	582.45	0.000	Shallow
MW-506D	588.19	588.42	23.00	28.00	565.42	560.42	562.92		5.99	27.53	582.20		Deep
MW-506S	588.18	588.42	4.00	9.00	584.42	579.42	581.92	19.00	5.97	9.23	582.21	-0.001	Shallow
MW-507D	586.34	583.93	20.00	25.00	563.93	558.93	561.43		4.53	26.08	581.81		Deep
MW-507S	586.32	583.88	2.00	7.00	581.88	576.88	579.38	17.95	4.50	9.64	581.82	-0.001	Shallow
MW-508D	584.68	584.96	24.00	29.00	560.96	555.96	558.46		3.70	29.46	580.98		Deep
MW-508S	584.67	584.93	1.50	6.50	583.43	578.43	580.93	22.47	3.69	6.23	580.98	0.000	Shallow
MW-509D	584.19	584.41	14.50	19.50	569.91	564.91	567.41		1.99	19.38	582.20		Deep
MW-509S	584.22	584.42	2.00	7.00	582.42	577.42	579.92	12.51	1.21	6.46	583.01	-0.065	Shallow
MW-510D	588.07	588.33	22.00	27.00	566.33	561.33	563.83		5.95	27.28	582.12		Deep
MW-510S	588.05	588.33	4.00	9.00	584.33	579.33	581.83	18.00	5.97	9.23	582.08	0.002	Shallow
MW-511D	588.22	588.41	23.00	28.00	565.41	560.41	562.91		6.51	28.51	581.71		Deep
MW-511S	588.15	588.41	4.00	9.00	584.41	579.41	581.91	19.00	6.46	9.27	581.69	0.001	Shallow
MW-512D	584.60	584.86	20.00	25.00	564.86	559.86	562.36		3.09	25.53	581.51		Deep
MW-512S	584.56	584.83	2.50	7.50	582.33	577.33	579.83	17.47	3.06	7.34	581.50	0.001	Shallow
MW-513D	585.29	585.54	20.50	25.00	565.04	560.54	562.79		3.65	23.31	581.64		Deep
MW-513S	585.23	585.44	2.50	7.50	582.94	577.94	580.44	17.65	3.60	7.21	581.63	0.001	Shallow
MW-514D	584.70	584.92	20.00	25.00	564.92	559.92	562.42		3.45	24.90	581.25		Deep
MW-514S	584.70	584.70	2.50	7.50	582.20	577.20	579.70	17.28	3.45	6.93	581.25	0.000	Shallow
MW-515D	583.90	583.88	21.00	26.00	562.88	557.88	560.38		2.34	26.23	581.56		Deep
MW-515S	583.71	583.97	3.00	8.00	580.97	575.97	578.47	18.09	2.47	7.90	581.24	0.018	Shallow
MW-516D	583.78	584.04	20.00	25.00	564.04	559.04	561.54		3.77	25.41	580.01		Deep
MW-516S	583.80	584.08	3.00	8.00	581.08	576.08	578.58	17.04	3.75	8.23	580.05	-0.002	Shallow
MW-517D	586.64	584.19	15.00	20.00	569.19	564.19	566.69		4.21	22.53	582.43		Deep
MW-517S	586.64	584.18	2.50	7.50	581.68	576.68	579.18	12.49	4.26	9.75	582.38	0.004	Shallow

Notes:
Survey coordinates are NAD 1983 State Plane Illinois East FIPS 1201 Feet
ft amsl = feet above mean sea level
ft btoc = feet below top of casing
*Negative value for vertical gradient denotes downward direction

TABLE 2
Monitoring Well Construction Table
OMC Plant 2

Well ID	Well diameter	Surface Completion	Date Installed	Total Depth (ft bgs)	Total Depth (ft btoc)	Screened Interval (ft bgs)	Filter Pack (ft bgs)	Annular Seal (ft bgs)	Bentonite/ Bentonite Slurry (ft bgs)	Initial Water Level (ft btoc)	Soil Boring Reference ID	Screened Zone Material	Surface Completion
Existing Monitoring Wells													
W-3	2" S.S.	Stick-up	NA	NA	24.20	NA	NA	NA	NA	NA	NA	NA	
W-4	2" S.S.	Flush Mount	NA	NA	23.64	NA	NA	NA	NA	NA	NA	NA	
W-5	2" S.S.	Stick-up	NA	NA	35.21	NA	NA	NA	NA	NA	NA	NA	
W-6	2" S.S.	Stick-up	NA	NA	32.10	NA	NA	NA	NA	NA	NA	NA	
W-7	2" S.S.	Stick-up	NA	NA	30.84	NA	NA	NA	NA	NA	NA	NA	
W-8	2" S.S.	Stick-up	NA	NA	34.23	NA	NA	NA	NA	NA	NA	NA	
W-9	2" S.S.	Stick-up	NA	NA	27.37	NA	NA	NA	NA	NA	NA	NA	
W-10	2" S.S.	Stick-up	NA	NA	25.05	NA	NA	NA	NA	NA	NA	NA	
W-11	2" S.S.	Stick-up	NA	NA	21.72	NA	NA	NA	NA	NA	NA	NA	
W-12	2" S.S.	Stick-up	NA	NA	29.10	NA	NA	NA	NA	NA	NA	NA	
W-13	2" S.S.	Stick-up	NA	NA	12.48	NA	NA	NA	NA	NA	NA	NA	
MW-100	2" SCH 40 PVC	Flush Mount	NA	NA	12.39	NA	NA	NA	NA	NA	NA	NA	X
MW-101	2" SCH 40 PVC	Flush Mount	NA	NA	12.47	NA	NA	NA	NA	NA	NA	NA	X
MW-102	2" SCH 40 PVC	Flush Mount	NA	NA	12.47	NA	NA	NA	NA	NA	NA	NA	X
MW-3S	2" SCH 40 PVC	Stick-up	NA	NA	14.89	NA	NA	NA	NA	NA	NA	NA	X
MW-3D	2" SCH 40 PVC	Stick-up	NA	NA	30.81	NA	NA	NA	NA	NA	NA	NA	X
MW-11S	2" SCH 40 PVC	Stick-up	NA	NA	14.22	NA	NA	NA	NA	NA	NA	NA	X
MW-11D	2" SCH 40 PVC	Stick-up	NA	NA	30.71	NA	NA	NA	NA	NA	NA	NA	X
MW-14S	2" SCH 40 PVC	Flush Mount	NA	NA	11.33	NA	NA	NA	NA	NA	NA	NA	X
MW-14D	2" SCH 40 PVC	Flush Mount	NA	NA	29.78	NA	NA	NA	NA	NA	NA	NA	X
MW-15S	2" SCH 40 PVC	Flush Mount	NA	NA	11.84	NA	NA	NA	NA	NA	NA	NA	X
MW-15D	2" SCH 40 PVC	Flush Mount	NA	NA	28.62	NA	NA	NA	NA	NA	NA	NA	X
Chemical Storage Area													
MW-509S	2" SCH 40 PVC	Flush Mount	3/22/2005	7.5	6.46	2.0–7.0	1.5–7.5	0.5–1.5	0.5–1.5	0.90	SO-065	sand	X
MW-509D	2" SCH 40 PVC	Flush Mount	3/22/2005	20.0	19.38	14.5–19.5	12.5–20.0	10.5–12.5	1.0–12.5	0.89	SO-065	sand	X
MW-517S	2" SCH 40 PVC	Stick-up	4/1/2005	8.0	9.75	2.5–7.5	2.0–8.0	0.5–2.0	0.5–2.0	4.09	SO-078	sand, sand and gravel, sand	X
MW-517D	2" SCH 40 PVC	Stick-up	4/1/2005	20.5	22.53	15.0–20.0	13.0–20.5	11.0–13.0	1.0–13.0	4.07	SO-078	sand	X
Northwest Portion of Site													
No monitoring wells installed due to existing monitoring well coverage and lack of viable location.													
Outside of Chip Dock Area													
MW-502S	2" SCH 40 PVC	Stick-up	3/17/2005	7.5	9.87	2.0–7.0	1.5–7.5	0.5–1.5	0.5–1.5	4.61	SO-063	silty sand	X
MW-502D	2" SCH 40 PVC	Stick-up	3/16/2005	23.5	25.84	18.0–23.0	16.0–23.5	14.0–16.0	2.0–16.0	4.50	SO-063	silty sand	X
Outside of Chip Room													
MW-503S	2" SCH 40 PVC	Flush Mount	3/16/2005	7.5	7.33	2.0–7.0	1.5–7.5	1.0–1.5	1.0–1.5	2.25	SO-062	sand and gravel	X
MW-503D	2" SCH 40 PVC	Flush Mount	3/16/2005	25.5	23.89	20.0–25.0	18.0–25.5	16.0–18.0	2.0–18.0	2.20	SO-062	silty sand	X
Parking Lot between Old Die Cast Area and New Die Cast Area													
MW-507S	2" SCH 40 PVC	Stick-up	3/15/2005	7.5	9.64	2.0–7.0	1.5–7.5	1.0–1.5	1.0–1.5	4.32	SO-061	sand and gravel	X
MW-507D	2" SCH 40 PVC	Stick-up	3/15/2005	25.5	26.08	20.0–25.0	15.0–25.5	13.0–15.0	1.0–15.0	4.38	SO-061	silty sand	X
Near Corporate Offices													
MW-513S	2" SCH 40 PVC	Flush Mount	3/30/2005	8.0	7.21	2.5–7.5	2.0–8.0	0.5–2.0	0.5–2.0	3.49	SO-075	silty clayey sand, sand, sand and gravel, sand	X
MW-513D	2" SCH 40 PVC	Flush Mount	3/30/2005	25.5	23.31	20.0–25.0	18.0–25.5	16.0–18.0	1.0–18.0	3.51	SO-075	silty sand, sandy gravel, silty sand, and silty sand clay and gravel	X
MW-514S	2" SCH 40 PVC	Flush Mount	3/30/2005	8.0	6.93	2.5–7.5	2.0–8.0	0.5–2.0	0.5–2.0	3.22	SO-079	sand, sand and gravel, sand	X
MW-514D	2" SCH 40 PVC	Flush Mount	3/30/2005	25.5	24.90	20.0–25.0	18.0–25.5	16.0–18.0	1.0–18.0	3.23	SO-079	sand, silty sand	X

TABLE 2
Monitoring Well Construction Table
OMC Plant 2

Well ID	Well diameter	Surface Completion	Date Installed	Total Depth (ft bgs)	Total Depth (ft btoc)	Screened Interval (ft bgs)	Filter Pack (ft bgs)	Annular Seal (ft bgs)	Bentonite/ Bentonite Slurry (ft bgs)	Initial Water Level (ft btoc)	Soil Boring Reference ID	Screened Zone Material	Surface Completion
Larson Marine Property–Near Slip 4													
MW-515S (North of Seahorse Drive)	2" SCH 40 PVC	Flush Mount	3/31/2005	8.5	7.90	3.0–8.0	2.5–8.5	0.5–2.5	0.5–2.5	2.24	SO-072	sand	X
MW-515D (North of Seahorse Drive)	2" SCH 40 PVC	Flush Mount	3/31/2005	26.5	26.23	21.0–26.0	19.0–26.5	17.0–19.0	1.0–19.0	2.19	SO-072	silty sand	X
MW-516S	2" SCH 40 PVC	Flush Mount	3/29/2005	8.5	8.23	3.0–8.0	2.5–8.5	1.0–2.5	1.0–2.5	3.60	SO-077	sandy fill, sand	X
MW-516D	2" SCH 40 PVC	Flush Mount	3/29/2005	25.5	25.41	20.0–25.0	18.0–25.5	16.0–18.0	1.0–18.0	3.61	SO-077	silty sand	X
Within the Plant 2 Building													
MW-504S	2" SCH 40 PVC	Flush Mount	3/18/2005	9.5	9.41	4.0–9.0	3.5–9.5	1.0–3.5	1.0–3.5	6.02	SO-067	silty sand and gravel fill, sandy silty clay, and sand and gravel	X
MW-504D	2" SCH 40 PVC	Flush Mount	3/18/2005	29.5	28.50	24.0–29.0	22.0–29.5	20.0–22.0	2.0–22.0	5.93	SO-067	silty sand	X
MW-505S	2" SCH 40 PVC	Flush Mount	3/18/2005	9.5	8.78	4.0–9.0	3.5–9.5	1.0–3.5	1.0–3.5	5.51	SO-071	sand, silty clayey sand, and sand	X
MW-505D	2" SCH 40 PVC	Flush Mount	3/25/2005	27.5	25.42	22.0–27.0	20.0–27.5	18.0–20.0	2.0–20.0	5.31	SO-071	sand, silty sand, and sand	X
MW-506S	2" SCH 40 PVC	Flush Mount	3/18/2005	9.5	9.23	4.0–9.0	3.5–9.5	1.0–3.5	1.0–3.5	5.78	SO-068	sand and gravel	X
MW-506D	2" SCH 40 PVC	Flush Mount	3/25/2005	28.5	27.53	23.0 -28.0	21.0–28.5	19.0–21.0	2.0–21.0	5.77	SO-068	silty sand	X
MW-510S	2" SCH 40 PVC	Flush Mount	3/18/2005	9.5	9.23	4.0–9.0	3.5–9.5	1.0–3.5	1.0–3.5	5.81	SO-069	silty clay and sand and gravel	X
MW-510D	2" SCH 40 PVC	Flush Mount	4/4/2005	27.5	27.28	22.0–27.0	20.0–27.5	18.0–20.0	2.0–20.0	5.81	SO-069	silty sand and silty sand and gravel	X
MW-511S	2" SCH 40 PVC	Flush Mount	3/18/2005	9.5	9.27	4.0–9.0	3.5–9.5	1.0–3.5	1.0–3.5	6.27	SO-070	Clayey sand, sand, and sand and gravel	X
MW-511D	2" SCH 40 PVC	Flush Mount	3/25/2005	28.5	28.51	23.0–28.0	21.0–28.5	19.0–21.0	2.0–21.0	6.33	SO-070	silty sand	X
Additonal Monitoring Wells Locations													
MW-508S (Along eastern access road)	2" SCH 40 PVC	Flush Mount	3/22/2005	7.0	6.23	1.5–6.5	1.0–7.0	0.5–1.0	0.5–1.0	3.51	SO-066	sand	X
MW-508D (Along eastern access road)	2" SCH 40 PVC	Flush Mount	3/22/2005	29.5	29.46	24.0–29.0	22.0–29.5	20.0–22.0	2.0–22.0	3.51	SO-066	silty sand	X
MW-512S (South of Triax Building)	2" SCH 40 PVC	Flush Mount	3/31/2005	8.0	7.34	2.5–7.5	2.0–8.0	0.5–2.0	0.5–2.0	2.80	SO-074	sand, sand and gravel, sand	X
MW-512D (South of Triax Building)	2" SCH 40 PVC	Flush Mount	3/31/2005	25.5	25.53	20.0–25.0	18.0–25.5	16.0–18.0	2.0–18.0	2.86	SO-074	silty sand	X
Replacement Monitoring Well Locations													
MW-500S	2" SCH 40 PVC	Stick-up	3/28/2005	7.0	9.07	1.5–6.5	1.0–7.0	0.5–1.0	0.5–1.0	3.64	SO-076	sand and sand and gravel	X
MW-500D	2" SCH 40 PVC	Stick-up	3/28/2005	26.0	27.12	20.5–25.5	18.5–26.0	16.5–18.5	2.0–18.5	3.72	SO-076	silty sand, clayey sandy silt, silty and sandy, silty gravel	X
MW-501S	2" SCH 40 PVC	Stick-up	4/4/2005	7.0	10.22	1.5–6.5	1.0–7.0	0.5–1.0	0.5–1.0	5.15	SO-073	sand and silty sand	X
MW-501D	2" SCH 40 PVC	Stick-up	4/4/2005	28.5	31.27	23.0–28.0	21.0–28.5	19.0–21.0	2.0–21.0	5.10	SO-073	silty sand, silty sandy clay, and silty sand	X

Notes:
a. ft bgs = feet below ground surface.
b. ft btoc = feet below top of casing
c. NA = not available
d. "S" suffix for well ID indicates shallow monitoring well
e. "D" suffix for well ID indicates deep monitoring well

TABLE 3
Monitoring Well Development Table
OMC Plant 2

Well ID	Date Developed	Initial DTW (ft btoc)	Ending Parameters: Turbidity (NTU)	Ending Parameters: Temp (C)	Ending Parameters: pH	Ending Parameters: Conductance (uS/cm)	Remarks	Development Method
Existing Monitoring Wells								
W-3	4/22/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-4	4/22/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-5	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-6	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-7	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-8	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-9	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-10	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-11	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-12	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
W-13	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-100	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-101	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-102	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-3S	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-3D	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-11S	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-11D	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-14S	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-14D	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-15S	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-15D	4/19/2005	NA	NA	NA	NA	NA	NA	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Chemical Storage Area								
MW-509S	4/14/2005	0.90	3.9	9.06	7.22	1,472	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-509D	4/14/2005	0.89	23.6	10.80	7.20	2,606	Slightly cloudy	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-517S	4/18/2005	4.09	2.4	10.96	7.19	726		Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-517D	4/18/2005	4.07	9.7	11.66	7.28	1,494	Slight sheen early in development	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Northwest Portion of Site								
No monitoring wells installed due to existing monitoring well coverage and lack of viable location.								
Outside of Chip Dock Area								
MW-502S	4/18/2005	4.61	2.6	8.46	6.93	796	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-502D	4/18/2005	4.50	5.0	12.02	6.78	1,637		Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Outside of Chip Room								
MW-503S	4/18/2005	2.25	7.2	7.19	6.78	931	Sheen, oily odor, PID $\geq$ 118.4 ppm	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-503D	4/18/2005	2.20	8.2	12.66	6.71	2,918	Slight sheen, blue-green color, PID $\geq$ 571 ppm	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser

TABLE 3

Monitoring Well Development Table

OMC Plant 2

Well ID	Date Developed	Initial DTW (ft btoc)	Ending Parameters				Remarks	Development Method
			Turbidity (NTU)	Temp (C)	pH	Conductance (uS/cm)		
Parking Lot between Old Die Cast Area and New Die Cast Area								
MW-507S	4/18/2005	4.32	2.9	8.57	7.36	386	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-507D	4/18/2005	4.38	7.6	11.36	7.29	684	Slight sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Near Corporate Offices								
MW-513S	4/14/2005	3.49	0.3	9.00	7.28	814	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-513D	4/14/2005	3.51	4.1	12.99	7.18	1,345	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-514S	4/14/2005	3.22	9.3	8.22	7.20	1,065	Slightly cloudy-clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-514D	4/14/2005	3.23	17.5	11.57	7.02	1,601	Slightly cloudy	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Larson Marine Property - Near Slip 4								
MW-515S (North of Seahorse Drive)	4/15/2005	2.24	1.3	8.27	7.26	423	Sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-515D (North of Seahorse Drive)	4/15/2005	2.19	6.9	11.66	7.19	3,676	Sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-516S	4/15/2005	3.60	0.9	8.37	6.77	841	Sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-516D	4/15/2005	3.61	5.7	11.18	7.39	7,802	Strong sulfur odor, degassing	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Within the Plant 2 Building								
MW-504S	4/18/2005	6.02	-0.1	9.07	6.78	1,013	Clear, no odor, PID 56.5 ppm	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-504D	4/18/2005	5.93	9.0	13.88	7.20	1,739	Mostly clear, sulfur odor, foam, PID 9.2 ppm	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-505S	4/18/2005	5.51	3.6	11.37	6.79	988		Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-505D	4/18/2005	5.31	8.1	15.36	6.90	1,305	slight solvent-like odor and organic	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-506S	4/18/2005	5.78	0.2	9.84	7.10	910	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-506D	4/18/2005	5.77	4.8	15.46	6.94	1,500	Clear, sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-510S	4/19/2005	5.81	NA	NA	NA	NA	Purged dry	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-510D	4/19/2005	5.81	0.4	15.52	7.28	1,438	Suds on water	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-511S	4/19/2005	6.27	-0.1	10.51	6.62	816	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-511D	4/19/2005	6.33	5.8	14.88	7.18	803	Clear, sulfur odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Additonal Monitoring Wells Locations								
MW-508S (Along eastern access road)	4/14/2005	3.51	NA	NA	NA	NA	Purged dry	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-508D (Along eastern access road)	4/14/2005	3.51	24.4	12.06	7.46	609	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-512S (South of Triax Building)	4/14/2005	2.80	4.4	11.54	7.16	770	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-512D (South of Triax Building)	4/14/2005	2.86	5.3	14.66	7.24	1,262	Clear	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
Replacement Monitoring Well Locations								
MW-500S	4/13/2005	3.64	5.0	9.05	7.27	582	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-500D	4/13/2005	3.72	10.2	12.13	7.14	1,655	Clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-501S	4/13/2005	5.15	2.0	7.18	7.07	834	Mostly clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser
MW-501D	4/13/2005	5.10	2.5	10.12	7.22	747	Mostly clear, no odor	Dual in-line Whale TM Pumps attached to 1" SCH 40 PVC riser

Notes:

a. ft btoc = feet below top of casing

b. NA = not available

TABLE 4

Monitoring Well and Piezometer Abandonment Table

OMC Plant 2

Well ID	Well diameter	Surface Completion	Date Installed	Date Abandoned	Abandonment Method
W-2A	1.25" S.S.	Stick-up	7/19/1979	4/4/2005	Casing removed below ground surface, grout to surface using tremie pipe.
W-2B	1.25" S.S.	Stick-up	7/20/1979	4/4/2005	Casing removed below ground surface, grout to surface using tremie pipe.
W-2C	1.25" S.S.	Stick-up	NA	4/5/2005	Casing removed below ground surface, grout to surface using tremie pipe.
W-4A	2" S.S.	Stick-up	7/23/1979	4/5/2005	Casing removed below ground surface, grout to surface using tremie pipe.
W-4B	2" S.S.	Stick-up	7/24/1979	4/5/2005	Casing removed below ground surface, grout to surface using tremie pipe.
W-4C	2" S.S.	Stick-up	7/24/1979	4/19/2005	Casing removed below ground surface, grout to surface using tremie pipe.
TP-10/TW-2	3/4" SCH 40 PVC	None	NA	4/20/2005	Casing removed, granular bentonite to surface.
W-14-JRB	1.5" S.S.	Stick-up	NA	4/19/2005	Casing removed below ground surface, grout to surface using tremie pipe.
TP-1	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.
MW-T106/TP-7	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.
MW-T105/TP-8	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.
MW-T104/TP-2	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.
MW-T101	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.
TP-11	3/4" SCH 40 PVC	None	NA	4/19/2005	Casing removed, granular bentonite to surface.

TABLE 5

Groundwater Field Parameters Summary

OMC Plant 2 Site

Well ID	Well Depth (ft)	Initial DTW (ft)	Ending Parameters DTW (ft)	pH	Temp (C)	Conductance (μS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	Flow Rate (ml/min)
Existing Monitoring Wells										
W-3	24.20	3.99	4.00	7.19	9.69	1037	1.20	47.1	-78.6	100
W-4	23.64	2.07	2.11	7.27	11.31	945	0.85	44.0	-122.5	100
W-5	35.21	7.21	7.27	7.35	12.33	702	0.50	3.6	2.9	100
W-6	32.10	6.15	6.19	N/A	11.42	2282	1.32	33.6	31.6	100
W-7	30.84	4.24	4.29	7.29	12.45	1099	0.79	52.2	-145.2	90
W-9	27.37	4.80	4.82	N/A	11.68	981	0.63	10.7	51.7	90
W-10	25.05	4.00	4.04	N/A	10.81	1626	0.63	46.2	112.3	80
W-11	21.72	5.64	5.67	6.85	13.20	1213	1.71	5.8	-112.9	100
W-12	29.10	4.40	4.43	N/A	11.52	604	0.26	10.0	-31.5	150
W-13	12.48	5.65	5.67	7.34	9.57	579	0.30	43.3	-192.7	90
MW-100	12.39	3.77	3.79	N/A	9.85	317	0.52	4.4	106.5	100
MW-101	12.47	4.05	4.06	N/A	11.18	489	0.36	2.4	13.9	100
MW-102	12.47	4.67	4.67	N/A	10.70	578	1.09	-0.6	72.0	110
MW-3S	14.89	6.22	6.22	N/A	10.85	544	0.48	-1.0	164.0	110
MW-3D	30.81	6.20	6.23	N/A	11.13	7471	2.06	11.1	114.4	90
MW-11S	14.22	6.10	6.11	7.11	8.05	544	0.57	20.7	-119.9	110
MW-11D	30.71	6.00	6.02	7.14	9.42	1411	0.58	68.8	-130.9	110
MW-14S	11.33	2.32	2.33	7.35	8.89	742	0.40	2.8	-218.0	120
MW-14D	29.78	2.44	2.49	7.51	11.47	3665	1.64	-0.6	-198.4	95
MW-15S	11.84	2.95	2.95	7.13	8.31	455	0.54	13.2	259.7	120
MW-15D	28.62	3.00	3.03	7.02	9.98	1288	0.72	23.3	-118.4	100
Chemical Storage Area										
MW-509S	6.46	1.10	1.11	7.02	12.37	1176	0.19	-3.0	-11.1	100
MW-509D	19.38	1.08	1.09	N/A	9.97	1842	0.60	40.7	22.3	90
MW-517S	9.75	4.25	4.25	7.10	11.78	730	0.17	0.6	-67.4	80
MW-517D	22.53	4.24	4.25	7.07	12.26	1328	0.27	11.30	80.4	110
Outside of Chip Dock Area										
MW-502S	9.87	4.79	4.81	6.96	12.70	807	0.35	5.2	-43.4	100
MW-502D	25.84	4.69	4.71	6.84	12.62	1459	0.35	13.70	-44.6	100
Outside of Chip Room										
MW-503S	7.33	2.43	2.45	6.60	8.90	801	0.21	3.1	-44.1	110
MW-503D	23.89	2.42	2.45	6.50	10.71	2334	0.32	8.5	-29.9	90
Parking Lot between Old Die Cast Area and New Die Cast Area										
MW-507S	9.64	4.47	4.48	7.42	9.08	335	0.52	3.7	-161.7	100
MW-507D	26.08	4.49	4.54	7.34	9.64	600	0.31	28.8	-163.8	100
Near Corporate Offices										
MW-513S	7.21	3.59	3.60	7.27	9.27	523	0.99	3.9	-68.3	90
MW-513D	23.31	3.65	3.68	7.18	10.02	745	0.94	17.4	-111.2	100
MW-514S	6.93	3.47	3.47	7.09	10.81	574	0.43	0.9	8.7	100
MW-514D	24.90	3.46	3.48	7.16	11.30	978	0.22	14.0	-75.9	110
Larson Marine Property - Near Slip 4										
MW-515S (north of Seahorse Drive)	7.90	2.47	2.47	7.19	9.28	482	0.43	2.5	-91.6	90
MW-515D (north of Seahorse Drive)	26.23	2.98	2.38	7.14	10.45	3488	0.27	9.9	-55.0	90
MW-516S	8.23	3.78	3.79	6.57	8.98	749	1.14	4.3	10.5	90
MW-516D	25.41	3.78	3.83	7.44	9.20	6922	0.27	7.9	-70.5	90
Within the Plant 2 Building										
MW-504S	9.41	6.23	6.24	6.46	9.60	808	0.37	3.6	162.8	90
MW-504D	28.50	6.18	6.21	7.04	11.46	1330	0.20	9.9	-43.9	85
MW-505S	8.78	5.71	5.73	6.58	11.45	1155	0.21	4.9	-77.0	90
MW-505D	25.42	5.51	5.56	6.74	13.16	1108	0.20	75.4	5.7	90
MW-506S	9.23	6.01	6.02	6.94	10.11	863	0.30	6.4	-66.4	110
MW-506D	27.53	6.01	6.04	6.86	12.51	1252	1.11	23.2	-65.1	95
MW-510S	9.23	5.97	6.01	7.04	11.25	652	0.48	3.5	-7.3	95
MW-510D	27.28	6.00	6.02	7.20	13.23	1234	0.63	13.2	-92.8	110
MW-511S	9.27	6.46	6.46	6.66	10.76	816	0.68	0.4	107.5	85
MW-511D	28.51	6.52	6.52	7.18	12.61	687	0.56	26.0	-26.3	80
Additonal Monitoring Wells Locations										
MW-508S (along eastern access road)	6.23	3.59	3.60	7.29	9.70	485	0.36	3.4	-127.1	110
MW-508D (along eastern access road)	29.46	3.59	3.66	7.42	10.88	417	0.31	39.3	-142.3	110
MW-512S (south of Triax Building)	7.34	3.07	3.07	6.94	12.03	451	0.47	5.7	158.2	90
MW-512D (south of Triax Building)	25.53	3.09	3.12	7.12	12.21	892	0.19	10.5	-43.8	90
Replacement Monitoring Well Locations										
MW-500S	9.07	3.86	3.88	N/A	10.95	366	0.49	7.3	221.6	90
MW-500D	27.12	3.83	3.83	N/A	13.06	1791	0.25	31.3	-18.0	100
MW-501S	10.22	5.03	5.05	7.13	11.21	1013	1.20	1.9	-36.7	100
MW-501D	31.27	5.00	5.03	7.36	10.08	605	0.51	18.7	-141.8	90

Attachment 1

Monitoring Well Installation Soil Boring Logs

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-500	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot, along North Guardrail
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.3' bgs START: 3/25/05 FINISH: 3/25/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4				Asphalt, silty, sandy gravel fill, HF, dark brown, dry	PID = 0.0 ppm
	0.4-0.9		3.2/4		Sandy, clay and gravel fill, HF, orange-brown, damp	Some sands may be of "foundry sand" origin PID = 0.0 ppm
1	0.9-2.3				Sand, SP, light brown, moist, loose; trace gravel; sands are coarse-grained	
2						∇ water table @ ~ 2.3' bgs
	2.3-4				Sand, SP, tan/brown, wet; sands are fine- to medium-grained	PID = 0.0 ppm
3						
						PID = 0.0 ppm
4	4-6		3.9/4		Sand and gravel, SP, light brown, wet; coarse-grained sands; gravel is subrounded to rounded	PID = 0.0 ppm
5						
6	6-8				Sand and gravel, SP, light grey to grey/brown, wet; sands are fine to medium with coarse sand/gravel lenses (6.9-7.1' bgs and 7.5-7.7' bgs)	PID = 0.0 ppm
7						
8	8-13.3		2.7/4		Sand, SP, grey/brown to grey, wet; trace gravel; sands are fine to medium with coarse sand/gravel lenses at 8.6-8.7' bgs and coarse sands at 12.6-13.3' bgs	PID = 0.7 ppm PID = 4.8 ppm PID = 9.5 ppm PID = 7.9 ppm PID = 2.1 ppm
9						
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-500	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS | LOCATION: North Parking Lot, along North Guardrail

ELEVATION: | DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.3' bgs | START: 3/25/05 | FINISH: 3/25/05 | LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4			PID = 15.3 ppm
13	13.3-20.7				Silty sand, SM/SP grey/brown to grey, wet, fine sands; clay lens at 14.1-14.13' bgs; trace gravel	PID = 2.1 ppm PID = 0.0 ppm
14						
15						
16			2.7/4			PID = 0.0 ppm
17						PID = 0.0 ppm
18						PID = 0.0 ppm
19						
20	20.7-20.9		3/4		Silty sand, SP/SM, grey/brown, wet; trace gravel; fine sands	
	20.9-21.3				Clayey, sandy, silt, ML, grey/brown, wet, laminations	
21	21.3-25				Silty sand, SP/SM, grey/brown, wet, trace gravel; fine sands, trace shell fragments	
22						
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-500	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North Parking Lot, along North Guardrail
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.3' bgs START: 3/25/05 FINISH: 3/25/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4			
25	25-25.4				Sandy, silty gravel, GM, grey/brown, wet, shell fragments, some whole shells intact; gravel is subangular to subrounded	
	25.4-28				Silty clay, CL, brown, damp, stiff (till)	
26						
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-501	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along North Ditch NE Corner of Site
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1.5' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.3		2.5/4		Sandy topsoil and gravel fill, HF, brown to light brown, damp, loose	PID = 0.0 ppm
	0.3-4.8				Sand, SP, light brown, damp to wet at ~ 1.5' bgs; trace gravel	PID = 0.0 ppm
1						
2						
3						PID = 0.0 ppm
4			3/4			
5	4.8-8				Silty sand, SM, dark grey, wet, trace gravel; sands are fine to medium; gravel is angular to rounded	Odor: "organics" PID = 0.0 ppm
6						
7						
8	8-13.8		2.6/4		Sand, SP, grey to grey/brown, wet, fine to coarse sands; trace gravel; very coarse sands from 8-8.4' bgs and 9.8-10.3' bgs are dark grey to black in color; black coating on gravels	PID = 0.0 ppm PID = 0.0 ppm Odor: "organics"
9						
10						
11						
12						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-501	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS | LOCATION: Along North Ditch NE Corner of Site

ELEVATION: | DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 1.5' bgs | START: 3/23/05 | FINISH: 3/23/05 | LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/4		Very coarse sands and gravel from 12-12.5' bgs are dark grey to black in color; black coating on gravels;	Odor: "organics"
13						
14	13.8-25				Silty sand, SP, grey/brown, wet; trace gravel; sands are very fine to medium	PID = 0.0 ppm
15						
16			2.2/4			PID = 0.0 ppm
17						
18						
19						
20			2.6/4			
21						
22						
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-501	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along North Ditch NE Corner of Site
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 1.5' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			PID = 0.0 ppm
25	25-25.3				Silty sandy clay, SC, grey/brown, wet, laminations throughout interval	
	25.3-28.5				Silty sand, SM/SP, grey brown, wet, laminations from 25.3-25.7' bgs	
26						
27						
28						
					EOB @ 28.5' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-502	SHEET 1 OF 2

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Northwest Loading Dock
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.4/4		Silty sand and gravel fill, HF, light brown, dry, loose	
	0.7-1.5				Silty sandy clay fill, HF, orange/brown, dry, loose	PID = 0.0 ppm
1						
	1.5-6				Silty sand, SP/SM, light brown to dark grey, black streaks near top of interval, moist to wet at 4' bgs; trace gravel, sands are fine to medium	Collect geotech sample from 1.5-2.5' bgs
2						
3						Collect soil sample from 2.6-3.4' bgs
4						∇ water table @ ~4' bgs (rough estimate)
			4/4			
5						
6						
	6-6.3				Silty clay, OL, black, wet, highly organic, partially decomposed plant matter	PID = 0.0 ppm
	6.3-7				Sand, SP, light brown, wet, trace gravel; sands are fine to medium	Collect geotech sample from 6.5-7.5' bgs
7	7-8				Sand and gravel, SP, grey-brown, wet; trace shell fragments; gravels are well rounded	Collect soil sample from 7.5-8' bgs PID = 0.0 ppm
8	8-8.3		3.6/4		Gravel, SP, various colors, wet; rounded gravels	
	8.3-12.7				Sand and gravel, SP, grey-brown, wet, trace shell fragments	PID = 0.0 ppm
9						
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-502	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Northwest Loading Dock

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12.7-23.5				Silty sand, SP/SM, brown, wet; trace gravel and shell fragments	PID = 0.0 ppm
13						
14						
15						
16			3.1/4			PID = 0.0 ppm
17						
18						
19						
20			2.5/3.5			Collect geotech sample from 20.5-22' bgs
21						PID = 0.0 ppm
22						Collect soil sample from 22-22.5' bgs
23						
					Refusal at 23.5' bgs	
24						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-503	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building
ELEVATION: DRILLING CONTRACTOR IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		2.3/4		Silty clay and gravel fill, HF, white to light brown, dry, loose	~ 9" of concrete above soil PID = 0.9 ppm
1	0.8-1.3				Silty clay and gravel fill, HF, orange brown, damp, medium	PID = 29.4 ppm Collect soil sample from 0.8-2.3' bgs
	1.3-4				Sand and gravel, SP, fine to coarse sand, dark brown, loose, moist	PID = 222 ppm, "sheen," "diesel fuel" odor
2						
3						
4	4-8		1.5/4		Sand and gravel, SP, fine to coarse sand, dark brown, wet, loose	Collect soil sample from 4-5.5' bgs PID = 158 ppm, "sheen," "diesel fuel" odor
5						
6						
7						
8	8-12		NA	Liner bent in tube, pour contents out	Sand and gravel, SP, brown to dark brown, wet; sands are fine to medium	PID = 12.3 ppm
9						
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-503	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building
ELEVATION: DRILLING CONTRACTOR IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-13.7		3/4		Sand, SP, brown, wet; sands are fine to medium	PID = 8.9 ppm
13						
	13.7-14.4				Sand and gravel, SP, fine to coarse sand, brown, wet	PID = 41.9 ppm
14	14.4-16				Sand, SP, brown, wet, fine to medium sands	PID = 6.8 ppm
15						
16	16-20		3.1/4		Sand, SP, brown, wet, trace gravel from 16.8-17.3' bgs; sand is fine- to medium-grained	PID = 35.1 ppm
17						
18						
19						
20	20-24.6		3/4		Silty sand, SP/SM, grey/brown to brown, wet; trace gravel, sand is fine- to medium-grained	PID = 156.3 ppm Collect geotech sample from 20.5-22' bgs
21						
22						Collect soil sample from 22-24.6' bgs
23						
24						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-503	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Chip Wringer, Outside Building
ELEVATION: DRILLING CONTRACTOR IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: Estimated ~ 4' bgs (rough estimate) START: 3/15/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
25	24.6-25.5		0.6/1.5		Silty sand and gravel, SP/SM, brown, wet; gravel is angular to rounded; trace shell fragments, gravel of various mineralogy	PID = 91.6 ppm "Sheen" on water out of borehole
26					Refusal @ 2.25' bgs	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-504	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-3.2		3.6/4		Silty sandy clay and gravel fill, HF, brown, dark brown, orange-brown, dry, loose	PID = 9.7 ppm
1						
2						PID = 17.3 ppm
3	3.2-5.8				Silty sand and gravel fill, HF, orange-brown, dry, loose	PID = 15 ppm
4			3.3/4			PID = 12.3 ppm Collect soil sample from 4.5-5' bgs
5						Collect geotech sample from 5-6' bgs
6	5.8-6.5				Sandy silty clay, GL, dark brown/black, some decomposing organic material, wet	∇ water table @ ~6' bgs PID = 1.7 ppm Collect soil sample from 6-6.5' bgs PID = 8.1
7	6.5-12				Sand and gravel, SP, brown, wet; sand is fine to granular; gravel is subrounded to rounded	Collect geotech sample from 6.5-7.5' bgs
8			2.8/4			PID = 45.7 ppm
9						
10						PID = 15.7 ppm
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-504	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-16.5		2.9/4		Sand, SP, brown, wet; trace gravel; sand is fine to medium	PID = 24.9 ppm
13						PID = 55.9 ppm
14						PID = 121 ppm
						PID - 53.5 ppm
15						
						PID - 61.4 ppm
16						PID = 63.8
			2.7/4		Silty sand, SP/SM, grey with dark brown/ black laminations, wet; decomposing organics	PID = 72.5
	16.5-17					
17	17-19.3				Sand and gravel, SP, grey brown to brown, wet; sand grains medium to granular; gravel subangular to rounded	PID - 70.4
18						
19	19.3-28.6				Silty sand, SP/SM, grey to grey/brown, wet; some black laminations (few); sand is very fine to medium	PID = 91.8
20						
			2.3/4			PID = 97.6
21						
22						PID = 33.3
23						
						PID = 34.5
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-504	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: Near Loading Dock in Shipping and Receiving/MIP-021
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: water table @ ~ 6' bgs START: 3/17/05 FINISH: 3/17/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			PID = 3.2
25						PID = 0.0
26						PID = 0.0
27						PID = 0.0
28						Collect geotech sample from 28-28.8' bgs No soil sample collected
	~ 28.6-28.8	2.9/3.5			Silty sandy gravel, GM, unable to determine colors, wet	
29	28.8-31.5				Silty clay till, CL, grey/brown, wet	
30						
31						PID = 0.0 ppm
					EOB @ 3.15' bgs (refusal)	
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-505	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of Former Solvent Recycling Unit
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.4' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.6/4		Silty, sandy clay and gravel, HF, orange-brown, dry, loose	PID = 0.0 ppm
	0.5-1.1				Sand and gravel fill, HF, light brown, dry; sand is predominantly fine grained	PID = 0.0 ppm
1	1.1-5.7				Sandy fill, HF, light brown, dry to wet at 5.4' bgs, loose; trace clay lenses in sand; trace gravel	
2						
						Collect geotech sample from 2.4-3.4' bgs PID = 0.0 ppm
3						
4			3/4			Collect soil sample from 4-5' bgs
5						PID = 0.0 ppm ∇ water table @ ~ 5.4' bgs
	5.7-6.4				Silty clayey sand, SC, grey to black, wet; trace gravel, trace decomposed organics	
6						PID = 0.0 ppm
	6.4-16				Sand, SP, grey-brown to grey, wet; trace gravel (rounded); fine to medium sands; occasional dark grey cross-bedding	PID = 0.0 ppm
7						
8			3.1/4			Collect geotech sample from 8.3-9.3' bgs
9						Collect soil sample from 9.3-10.3' bgs PID = 0.0 ppm
10						Odor similar to "burnt oil"
11						PID = 0.0 ppm
12						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-505	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of Former Solvent Recycling Unit

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 5.4' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			PID = 0.0 ppm
13						
						Odor similar to "burnt oil"
14						
15						
16	16-23.6	Liner stuck, could not determine recovery			Sand, SP, light grey to light brown, wet, sands predominantly fine-grained; occasional grey-colored cross-bedding	PID = 12.4 ppm Odor similar to "burnt oil"
17						
18						PID = 6.6 ppm
19						
20			2/4			PID = 17.0 ppm
21						PID = 23.9 ppm
22						PID = 15.3 ppm Odor similar to "burnt oil"
23						
24	23.6-25.1				Silty sand, SM/SP, light grey to light brown, wet; sands are very fine to fine-grained	PID = 15.1 ppm

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-505	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: ~ 100' East of Former Solvent Recycling Unit
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 5.4' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.5/3			PID = 43.8 Collect geotech sample from 24-25' bgs
25	25.1-27				Sand, SP, grey/brown, wet; sands are fine- to medium-grained	Collect soil sample from 25-26.1' bgs PID = 20.6
26						
27					EOB @ ~ 27' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-506	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Metal Plating Room
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler
WATER LEVELS: ~ 5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-5		3.4/4		Silty sand and gravel fill, HF, brown to orange-brown, loose, dry	
1						Collect geotech sample 1-2.5' bgs
2						
3						Collect soil sample 2.5-3.4' bgs
4			3/4			
5	5-8				Sand and gravel, SP, brown, wet, medium sands, subangular to rounded gravel	∇ water table @ ~ 5' bgs Collect soil sample from 5-5.5' bgs Collect geotech sample from 5.5-6.5' bgs
6						
7						
8	8-8.8		2.8/4		Sand and gravel, SP/SW, brown, wet, coarse to granular sands (very coarse sands)	
9	8.8-16				Sand, SP, light brown, wet, trace gravel, rounded to subrounded	
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-506	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Metal Plating Room
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler
WATER LEVELS: ~ 5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3/4			Odor similar to "machinery" throughout interval
13						
14						
15						
16	16-20		3.1/4		Sand, SP, grey-brown, wet; sands are fine to medium	Odor similar to "machinery"/"burnt oil" throughout interval
17						
18						
19						
20	20-28.5		3/4		Silty sand, SP/SM, grey, wet; sands are fine-grained, some cross-bedding is visible as black laminations	Odor similar to "machinery"/"burnt oil"
21						
22						
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-506	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Near Metal Plating Room

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT w/Macrocore Sampler

WATER LEVELS: ~ 5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			
25						Odor similar to "machinery"/"burnt oil"
26						
27						
						Fine-grained sandstone in sampler shoe
28						
	28.5-28.6		3.5/3.5		Gravel, GP/GM, grey, wet, subangular	Collect soil sample from 28-28.6' bgs
	28.6-31.5				Silty clay till, CL, grey, dry, very stiff	
29						
30						
31						
					EOB @ 31.5' bgs	
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-507	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS
LOCATION: North of Trim Building/Former AST Area
ELEVATION:
DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs
START: 3/14/05
FINISH: 3/15/05
LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.7		3.4/4		Silty gravel fill, HF, light grey to white, damp, loose	PID = 0.0 ppm
1	0.7-1.3				Silty, sandy, clay and gravel fill, HF, brown to orange-brown, damp, loose	
2	1.3-2.3				Clayey sand and gravel fill, HF, medium to fine-grained sands, dark brown/black from 1.3-1.6' bgs, tan/brown 1.6-2.3' bgs, moist	Collect soil sample from 1.6-2.3' bgs Collect from second soil core geotech sample from 1.3-2.3' bgs
3	2.3-4				Sand and gravel, SP, coarse to medium-grained, grey-brown, moist to wet at 2.7' bgs; gravel is well rounded	PID = 0.0 ppm ∇ water table at 2.7' bgs
4						
5	4-9.2		4/4		Sand and gravel, SP, coarse to medium-grained, grey brown, wet; gravel is well rounded	PID = 0.0 ppm Collect geotech sample from 4-6' bgs
6						
7						Collect soil sample from 6-8' bgs
8						
9			2.7/4			
10	9.2-12				Sand, SP, fine- to medium-grained, grey brown, wet	PID = 0.0 ppm
11						
12						

CH2MHILL

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-507 SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Trim Building/Former AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/14/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	12-13.7		3.3/4		Sand and gravel, SP/SW, fine to coarse sands, brown, wet, coarse sands from 12-12.5' and 13.3-13.7' bgs; gravel is subangular to well-rounded	PID = 0.0 ppm
13						
	13.7-16				Silty sand, SP/SM, fine-grained sand, trace gravel, brown to dark brown, wet	End 3/14/05
14						
15						
16						
	16-20		1.3-4		Silty sand, SP/SM, fine-grained, brown, wet	Start 3/15/05 PID = 0.0 ppm
17						
18						
19						
20						
	20-24		2.5-4		Silty sand, SP/SM, fine-grained, grey-brown to brown, wet	PID = 0.0 ppm
21						
22						
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-507	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: North of Trim Building/Former AST Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/14/05 FINISH: 3/15/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	24-26.5		3/3		Silty sandy clay, CL, brown, wet, medium	Collect soil sample from 24-24.5' bgs Collect geotech sample from 24.5-26.5' bgs
25						PID = 0.0 ppm
26						
	26.5-27				Till, silty clay and gravel, CL, dark grey/brown, stiff	PID = 0.0 ppm
27					EOB @ 27' bgs, refusal	
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-508	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.2				Topsoil fill, sandy, HF, dark brown, dry, loose	
	0.2-3.4		3.8/4		Sand, SP, brown, damp to wet at ~ 2.1' bgs; medium sands	Collect soil sample from 0.5-1' bgs PID = 0.8 ppm
1						Collect geotech sample from 1-2' bgs
2						∇ water table @ ~ 2.1' bgs
3						
	3.4-4				Sand, SP, grey, wet, medium sands	PID = 1.1 ppm
4	4-10.3		4/4		Sand, SP, brown to grey-brown, wet, medium with trace coarse sands and gravel (rounded)	Collect soil sample from 4.5-5' bgs PID = 0.0 ppm Collect geotech sample from 5-6.5' bgs
5						
6						
7						
8			3/4		Black laminations/bedding at 8.2-8.3' bgs and 9.1-9.2' bgs	
9						
10	10.3-20				Sandy, SP, grey to grey-brown, wet; sands are fine to medium-grained; trace granules (rounded) and coarse sands	PID = 0.0 ppm
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-508	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.3/4			PID = 0.0 ppm
13					13	
14					14	
15					15	
						PID = 0.0 ppm
16					16	PID = 0.0 ppm
			2.8/4			
17					17	
18					18	
19					19	PID = 0.0 ppm
20					20	
	20-29		NA	Liner bent in sampler, empty contents out	Sand, SP, grey, wet; sand is fine-grained	PID = 0.0 ppm
21					21	
22					22	
23					23	
24					24	

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-508	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Along Eastern Access Road
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			NA	Liner bent in sampler, empty contents out	Silty sand, SP/SM, grey, wet.	
25						PID = 0.0 ppm
26						
27						
28						Collect soil sample from 28-29' bgs
			2.8/3			
29						PID = 0.0 ppm
	29-29.6				Silty clay, CH, brown, wet, "sticky," high plasticity, > 4" ribbons	Collect geotech sample from 29-30' bgs
	29.6-30.1				Silty sandy gravel, GM, grey/brown, wet; gravel is subangular to subrounded	PID = 0.0.ppm
30	30.1-31				Silty clay and gravel till, CL, brown, wet, stiff	PID = 0.0 ppm
31						
					EOB @ 31.0' bgs (refusal)	
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-509	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property Near MIP-028
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		3.6/4		Asphalt, silty sandy clay and gravel fill, HF, dark brown to orange-brown, dry to damp at 0.7' bgs	PID = 0.0 ppm Collect geotech sample from 0.9-1.9' bgs
1	0.9-1.6				Sand, SP, brown to dark brown, damp, fine to medium sands	
	1.6-5.6				Sand, SP, brown, damp to wet at 2.7' bgs	
2						Collect soil sample from 1.9-2.7' bgs
						∇ water table @ ~ 2.7' bgs
3						
4						PID = 0.0 ppm
			3.6/4			
5						
	5.6-8				Sand and gravel, SP, brown, wet, fine to coarse sands	
6						Collect soil sample from 6-6.4' bgs PID = 0.0 ppm Collect geotech sample from 6.4-7.4' bgs
7						
8	8-21		3/4		Sand, SP, grey-brown, wet, fine to medium sands; trace granules and gravel, gravel is rounded	PID = 0.0 ppm
9						
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-509	SHEET 2 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Property Near MIP-028
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/16/05 FINISH: 3/16/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.3/4		Very coarse sand interval 12-12.5' bgs	PID = 0.0 ppm
13						
14						
15						
16			3/4			PID = 0.0 ppm
17						
18						
19						Collect soil sample from 19.5-20' bgs
20			1/1			Collect geotech sample from 20-21' bgs
21					EOB, refusal at 21' bgs	
22						
23						
24						

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CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-510	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		2/4		Silty sand and gravel fill, HF, orange-brown to grey, dry	PID = 0.0 ppm Collect soil sample from 0-1.7' bgs
1	0.9-6				Sand and gravel fill, HF, light brown to brown, dry to moist; wood (decomposed) at 1.7-1.9' bgs	PID = 0.0 ppm
2						
3						
4			2.9/4			Collect geotech from 4-5.5' bgs
5						∇ water table @ ~ 5.5' bgs
6	6-6.3 6.3-9.2				Silty clay, OH, dark brown, wet Sand and gravel, SP, grey-brown, wet; medium sands	Collect geotech sample from 5.5-6.5' bgs PID = 0.0 ppm
7						
8			2.4/4			Collect soil sample from 8-10.4' bgs
9	9.2-9.4 9.4-15.4				Sand and gravel, SP, grey, wet, very coarse sands Sand, SP, grey to grey/brown, wet; medium sands, trace gravel	PID = 0.0 ppm
10						
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	**MW-510**	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.6/4		Trace coarse sand from 12.1-12.3' bgs	PID = 0.0 ppm
13						
14						
15						
	15.4-20				Sand, SP, grey, wet; sand is fine- to medium-grained; trace gravel	
16						Odor similar to "machinery" or "burnt oil"
			2.8/4			PID = 0.0 ppm
17						
18						
19						
20						
	20-25.5		2.5/4		Silty sand, SP/SM, grey, wet; sand is very fine- to fine-grained; trace gravel	PID = 0.0 ppm
21						
22						
						PID = 0.0 ppm
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-510	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Near MIP-043
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: Geoprobe 6610 DT
WATER LEVELS: ~ 5.5' bgs START: 3/21/05 FINISH: 3/21/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.4/4			Collect soil sample from 24-25.5' bgs
25						
26	25.5-27.5				Silty sand and gravel, SP/SM, grey, wet; gravel of various sizes; subangular to rounded gravel	PID = 0.0 ppm
27						Collect geotech sample from 26.5-27.5' bgs
28	27.5-28				Silty clay, CL, dark grey, very stuff, dry	PID = 0.0 ppm
					EOB @ 28' bgs	
29						
30						
31						
32						
33						
34						
35						
36						

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CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-511	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Just West of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler
WATER LEVELS: ~ 5.5' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.9		3.8/4		Silty sandy clay and gravel fill, HF, orange-brown to dark brown, dry to damp at ~ 1' bgs, loose	PID = 2.1
1	0.9-2				Sandy fill, HF, light brown, damp, trace gravel; sand is fine- to medium-grained	PID = 3.4
2	2-2.7				Sandy clay fill, HF, brown to dark brown, damp, trace gravel	PID = 2.4
	2.7-3.3				Sandy fill, HF, light brown, damp	PID = 2.1
3						Collect soil sample from 3.3-4.5' bgs
	3.3-5				Clayey sand fill, HF, dark brown to brown, damp	PID = 14.3
4			2.9/4			
5						Collect geotech sample from 4.5-5.5' bgs
	5-8				Sand, SP, light brown, damp to wet at 5.5' bgs; trace gravel	PID = 0.0 ppm
6						∇ water table @ ~ 5.5' bgs
7						
8	8-8.4		3/4		Sand and gravel, SP, light brown, wet; gravel is subrounded to well rounded; very coarse sands from 8-8.4' bgs; otherwise, medium sands	Collect geotech sample from 8-9.5' bgs PID = 0.0 ppm
9	8.4-17.6				Sand, SP, brown, wet, trace gravel; sands are medium with occasional coarse sands	PID = 0.0 ppm
10						Collect soil sample from 9.5-10.5' bgs
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-511	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Just West of Triax

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler

WATER LEVELS: ~ 5.5' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			
13						
14						
15						
16						
			2.3/4			PID = 0.0 ppm
17						
	17.6-17.8				"Gravels increase just above silty clay;" silty clay, CL, grey, wet, very soft	PID = 0.0 ppm Odor similar to "burnt oil"
18	17.8-21.3				Sand, SP, grey/brown, wet, fine to medium sands	
19						
20						
21						PID = 0.0 ppm
	21.3- ?	Not able to determine--sample liner stuck			Silty sand, SM/SP, grey, wet	Odor similar to "burnt oil"
22						
23						
						PID = 0.0 ppm
24						

CH2MHILL

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-511 SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Metal Working Area Just West of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe 2" O.D. Macrocore Sampler
WATER LEVELS: ~ 5.5' bgs START: 3/22/05 FINISH: 3/22/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4			
25					25	
26					26	PID = 0.0 ppm
27					27	
28					28	Collect soil sample from 28-28.9' bgs PID = 0.0 ppm
			1.9/3			
29					29	Collect geotech sample from 28.9-29.9' bgs
30					30	
31					31	
					EOB at 31' bgs (refusal)	
32					32	
33					33	
34					34	
35					35	
36					36	

SOIL BORING LOG

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-512	SHEET 1 OF 3

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.4		3.5/4		Asphalt, silty sandy gravel fill, HF, grey to brown, dry, loose	PID = 0.0 ppm Collect soil sample from 0.4-0.8' bgs Collect geotech sample from 0.5-1.5' bgs
1	0.4-1.7				Silty sandy clay and gravel fill, HF, brown to light tan, dry to damp, loose, some brick pieces at bottom of interval	
2	1.7-2.4				Silty, sand and gravel fill, HF, black, moist to wet at 2.1' bgs	PID = 0.0 ppm Collect soil sample from 2.1-2.4' bgs
3	2.4-4.8				Sand, SP, light brown, wet, trace gravel, medium sands	Possible "foundry sands" PID = 0.0 ppm PID = 0.0 ppm Collect geotech sample from 2.5-3.5' bgs
4			3.6/4			
5	4.8-6.1				Sand and gravel, SP, light brown, wet, medium sands	PID = 1.4 ppm
6	6.1-6.7				Sand and gravel, GP/SP, light brown, wet, very coarse sands, gravel is rounded to subrounded	PID = 2.8 ppm
7	6.7-10.7				Sand, SP, light brown, wet, trace gravel and medium sands	PID = 7.4 ppm
8			3.6/4			
9						PID = 9.9 ppm
10						PID = 8.1 ppm
11	10.7-17.3				Sand, SP, grey/brown, wet, fine to medium sands, trace coarse sands and gravel	PID = 7.6 ppm
12						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-512	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
12		Liner stuck; unable to determine recovery				PID = 11.0 ppm
13						PID = 9.9 ppm
14						
15						
16			2.5/4			PID = 10.8 ppm
17	17.3-25.2				Silty sand, SM/SP, grey to grey/brown, wet, dark grey silt laminations near top of interval	PID = 6.7 ppm
18						
19						PID = 5.8 ppm
20			2.9/4			
21						PID = 6.7 ppm
22						Collect soil sample from 22 to 22.9' bgs PID = 7.1 ppm
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-512	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just South of Triax/MIP-070
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.1' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.2/3			Collect geotech sample from 24.1-25.1' bgs PID = 44.8 ppm
25	25.2-25.6				Silty clay, CH, brown, wet, elastic	PID = 0.2 ppm
	25.6-25.8				Silty gravel, GM, grey, wet	
26	25.8-27				Till, silty clay, CL, grey, damp, stiff, trace gravel	
27					EOB @ 27' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-513	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.8		3.7/4		Silty clay topsoil fill, HF, dark brown, damp, medium soft	PID = 0.0 ppm
1	0.8-2.3				Silty clay and gravel fill, HF, orange-brown, damp, medium soft	PID = 0.0 ppm
2	2.3-3.4				Silty, clayey, sand and gravel fill, HF, brown to orange-brown, damp to moist	Collect geotech sample from 2.4-3.3' bgs PID = 0.0 ppm Collect soil sample from 2.4-2.8' bgs
3	3.4-5.9				Sand, SP, grey to light brown, wet, trace gravel; medium sands	PID = 0.0 ppm
4			2.9/4			
5						PID = 0.0 ppm Collect soil sample from 5.4-5.9' bgs PID = 0.0 ppm
6	5.9-6.6				Sand and gravel, GP, light brown, wet; gravel is subangular to well-rounded	Collect geotech sample from 5.9-6.9' bgs
7	6.6-13.3				Sand, SP, light brown, wet, trace gravel; medium sands, trace coarse sands	PID = 0.0 ppm
8			2.7/4		Zone of gravel 8.3-8.4' bgs	PID = 0.0 ppm
9					Coarse sands 9.7-10.2' bgs	PID = 0.0 ppm
10						PID = 0.0 ppm
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-513	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.7/4		Coarse sand bedding at 12.1 to 12.3' bgs and 12.9' bgs	PID = 0.0 ppm
13	13.3-16.6				Sand, SP, light brown to grey/brown, wet, fine sands, trace gravel and coarse sands	PID = 0.0 ppm
14						
15						
16			2.8/4		Coarse sands from 16-16.6' bgs	PID = 0.0 ppm
	16.6-21.3				Silty sand, SM/SP, grey to grey-brown, wet, dense, silt laminations from 16.6-16.9' bgs are dark grey in color, sands are fine-grained; trace shell fragments	PID = 0.0 ppm
17						
18						
19						
20			3.1/4			
21	21.3-21.8				Sandy gravel, GP, grey-brown, wet; gravel is well-rounded and uniform in size	Took photograph; PID = 0.0 ppm
	21.8-24.4				Silty sand, SP/SM, grey/brown, wet; silt dark grey laminations start at 22.4' bgs; trace gravel and shell fragments	PID = 0.0 ppm
22						Collect soil sample from 22.4-22.9' bgs
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-513	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: West Side of Corporate Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 3.4' bgs START: 3/24/05 FINISH: 3/24/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	24.4-24.8		2.5/4		Silty sandy clay and gravel, GC, brown, wet	Collect geotech sample from 24-24.8' bgs
	24.8-28				Till, silty clay, CL, grey, dry, stiff; trace gravel throughout (~ 0.3' in diameter)	PID = 0.0 ppm
25						
26						
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-514	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.6/4		Topsoil fill, HF, dark brown, damp	PID = 0.0 ppm
1	0.5-1.4				Silty clay and gravel fill, HF, orange-brown, damp	PID = 0.0 ppm
2	1.4-6				Sand, SP, grey/brown to brown, damp to wet at 2.7' bgs; trace gravel, sands are medium with some coarse sand intervals	Collect geotech sample from 1.6-2.6' bgs Collect soil sample from 1.4-2.7' bgs PID = 0.2 ppm ∇ water table @ ~ 2.7' bgs Collect soil sample from 2.7-3.6' bgs
3						PID = 1.8 ppm
4			3.3/4			
5						PID = 1.7 ppm Collect geotech from 4.5-6' bgs
6	6-6.4				Sand and gravel, SP/GP, brown, wet, gravel is subangular and rounded; sand is medium-grained; gravel up to 0.1' in diameter	
7	6.4-14.1				Sand, SP, brown, wet, trace gravel; medium sands; trace coarse sands	PID = 3.5 ppm
8			3.1/4		Coarse sands 8-8.5' bgs	PID = 8.2 ppm
9						PID = 24.5 ppm
10						PID = 28.7 ppm
11						PID = 53.5 ppm
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-514	SHEET 2 OF 3

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			PID = 24.7 ppm
13						Odor similar to "solvent"
14	14.1-18.5				Sand, SP, grey/brown, wet; fine sands; trace silt; trace shell fragments and coarse sands; some shells are fully intact	PID = 50.5 ppm
15						
16			2.8/4			PID = 67.1 ppm
17						PID = 91.0 ppm
18					Trace coarse sand, gravel, and shell fragments 17.7 to 17.73' bgs	PID = 100.8 ppm
19	18.5-20.6				Sand, SP, grey to grey-brown, wet; sands are fine- to coarse-grained; shell fragments throughout	Odor similar to "solvent" PID = 48.5 ppm
20			2.5/4			PID = 32.4 ppm
21	20.6-21.7				Sand, SP, brown, wet; sands are medium- to coarse-grained; coarse sands and gravel 21.2-21.5' bgs; clayey sands 20.3-20.4' bgs	Collect geotech sample from 20.6-21.6' bgs PID = 53.6 ppm
22	21.7-24.9				Silty sand, SP/SM, grey, wet; trace clay near bottom of interval	PID = 48.4 ppm
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-514	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: SE Grassy Area Near Corporate Building/ MIP-059
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.7' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.8/2.5			Collect soil sample from 24-24.9' bgs
	24.9-25.2				Silty clay, CL/ML, brown, wet, soft	PID = 3.8 ppm
25	25.2-25.4				Silty, sandy, gravel and clay, GM/GC, grey/brown, wet; clay has high plasticity (CH), soft to very soft	PID = 2.6 ppm
	25.4-26.5				Silty clay till, CL, brown, dry, stiff	
26						
					EOB @ 26.5' bgs (refusal)	
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-515	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just North of Seahorse Drive, South of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.5		3.5/4		Silty clay fill, HF, dark brown, damp, medium (topsoil)	PID = 0.0 ppm
	0.5-2				Silty sand and gravel fill, HF, dark brown, moist, loose	
1						Collect geotech sample from 1-2' bgs PID = 0.0 ppm
2	2-2.8				Sand, SP, brown to light brown, moist, fine to medium sands, loose	Collect soil sample from 2-2.8' bgs PID = 0.0 ppm
3	2.8-6.1				Sand, SP, light tan/brown, wet, loose, medium to coarse sands; trace gravel; coarse sand layer from 5.7-5.9' bgs	PID = 0.0 ppm
4			4/4			Collect soil sample from 4-5' bgs
5						Collect geotech sample from 5-6' bgs
6	6.1-13.2				Sand, SP, grey/brown, wet, loose, medium to coarse sands; trace gravel, dark grey laminations/cross-bedding from 6.3-6.5' bgs	PID = 0.0 ppm
7						PID = 0.0 ppm
8			3.1/4			
9						PID = 0.0 ppm
10						
11						PID = 0.0 ppm
12						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-515	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just North of Seahorse Drive, South of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.7/4			
13	13.2-20.9				Sand, SP, grey to grey/brown, wet; fine to medium sands; trace gravel	PID = 0.0 ppm
14						
15						
16			2.7/4			PID = 0.0 ppm
17						
18						
19						PID = 0.0 ppm
20			3/4			
21	20.9-26.6				Silty sand, SM/SP, light grey/brown, wet; predominantly fine sands	PID = 0.0 ppm
22						
23						
24						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-515	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Just North of Seahorse Drive, South of Triax
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 2.8' bgs START: 3/23/05 FINISH: 3/23/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			1.4/2.6			Collect soil sample from 24-24.4' bgs Collect geotech sample from 24.4-25.4' bgs
25						PID = 0.0 ppm
26						
27					EOB @ 26.6' bgs (refusal)	
28						
29						
30						
31						
32						
33						
34						
35						
36						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-516	SHEET 1 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Larsen Marine, Southeast Corner of IO Service Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs START: 3/28/05 FINISH: 3/28/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-1.6		3.8/4		Asphalt, silty, sand and gravel fill, HF, light brown to black, dry, loose	PID = 0.0 ppm
1	1.6-4				Sandy fill, HF, light brown to dark brown, damp to wet at ~ 2.8' bgs; sand is medium-grained	Collect geotech sample from 1.6-2.6' bgs Collect soil sample from 2.6-2.8' bgs PID = 0.0 ppm
2						
3						
4	4-10.3		Liner stuck, could not determine recovery		Sand, SP, grey to light brown, wet, trace gravel; sand is medium-grained, trace gravel is subrounded to well-rounded	Collect soil sample from 4-6' bgs PID = 0.0 ppm
5						
6						
7						
8			3.5/4			PID = 0.0 ppm Collect geotech sample from 8.5-10' bgs
9						
10	10.3-14				Coarse sands from 10-10.3' bgs Sand, SP, grey to grey/brown, wet; fine to medium-grained sands	PID = 0.0 ppm
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-516	SHEET 2 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Larsen Marine, Southeast Corner of IO Service Building

ELEVATION: DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~2.8' bgs START: 3/28/05 FINISH: 3/28/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			3.1/4			PID = 0.0 ppm
13						
14	14-16.2				Sand, SP, dark grey, wet; medium sands, trace coarse sands, trace gravel	"Organic" odor PID = 0.0 ppm
15						
16	16.2-25.3		2.8/4		Silty sand, SP/SM, dark grey, wet; trace gravel; sand is medium to fine-grained, dense	PID = 0.0 ppm
17						
18						PID = 0.0 ppm
19						
20			2.7/4			PID = 1.6 ppm
21						PID = 3.6 ppm
22						PID = 3.2 ppm
23						PID = 3.9 ppm
24						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-516	SHEET 3 OF 3

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Larsen Marine, Southeast Corner of IO Service Building
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~2.8' bgs START: 3/28/05 FINISH: 3/28/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.8/4			PID = 1.3 ppm Collect soil sample from 24-24.3' bgs Collect geotech sample from 24.3-35.3' bgs
25	25.3-28				Silty clay till, CL, light brown, dry, stiff	
26						
27						
28					EOB @ 28' bgs (refusal)	
29						
30						
31						
32						
33						
34						
35						
36						

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-517	SHEET 1 OF 2

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS — LOCATION: Outside SW Corner of Hallway to HAZMAT Storage Area

ELEVATION: — DRILLING CONTRACTOR: IPS

DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe

WATER LEVELS: ~ 0.6' bgs — START: 3/29/05 — FINISH: 3/29/05 — LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE: INTERVAL (FT)	SAMPLE: NUMBER AND TYPE	SAMPLE: RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
	0-0.6		3.1/4		Sandy, silt and gravel fill, HF, light tan to grey, damp	PID = 1.3 ppm; collect soil sample from 0-0.6' bgs; ∇ water table @ ~ 0.6' bgs
	0.6-1				Sand and gravel fill, HF, black, wet; possible foundry sand	PID = 0.0 ppm
1	1-1.4				Sand and gravel fill, HF, tan to grey, wet	PID = 0.0 ppm
	1.4-4				Sand, SP, brown to grey, wet; medium sands	Collect geotech sample from 1.5-2.5' bgs Collect soil sample from 2.5-3.1' bgs
2						
3						
4	4-5.1		Could not determine, liner stuck in sampling tube		Sand and gravel, SP, brown to grey-brown, wet; medium to coarse sands; gravel is flat and well-rounded; trace silt	"Sheen" on tube when pulled up from subsurface Odor similar to diesel fuel; PID = 0.0 ppm
5	5.1-10.4				Sand, SP, brown to grey/brown, wet; trace gravel; fine to coarse sands, but predominantly medium	PID = 0.0 ppm
6						
7						
8			3.1/4			
9						
10					Coarse sands from 10.2-10.4' bgs	
	10.4-14.3				Sand, SP, brown to grey/brown, wet; trace gravel, fine to medium sands; trace coarse sands; (sand with gravel from 10.8-10.9' bgs	
11						
12						

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-517	SHEET 2 OF 2

CH2MHILL

SOIL BORING LOG

PROJECT: OMC Plant 2 RI/FS LOCATION: Outside SW Corner of Hallway to HAZMAT Storage Area
ELEVATION: DRILLING CONTRACTOR: IPS
DRILLING METHOD AND EQUIPMENT USED: 8M Geoprobe
WATER LEVELS: ~ 0.6' bgs START: 3/29/05 FINISH: 3/29/05 LOGGER: C. LaCosse

DEPTH BELOW SURFACE (FT)	SAMPLE INTERVAL (FT)	SAMPLE NUMBER AND TYPE	SAMPLE RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY, OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY.	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION.
			2.9/4		Coarse sands from 12.1-12.3' bgs and 13.3-14.3' bgs	PID = 0.0 ppm
13						
14	14.3-20				Sand, SP, brown, wet; very fine to medium sands; trace silt	
15						
16			1.1/4			Collect geotech sample from 16.1-17.1' bgs PID = 0.0 ppm
17						
18					Refusal at ~ 18' bgs; offset ~ 5' to southeast	Wood in sampler shoe; will offset to continue sampling
19						
20	20-20.3 20.3-20.7 20.7-22		1.9/2		Silty sand and gravel, SP/GM, brown/grey, wet Silty, sandy, gravel, GM, brown/grey, wet Silty clay till, CL, brown, dry; trace gravel from 20.7-21' bgs	Collect soil sample from 20-20.7' bgs PID = 0.0 ppm
21						
22					EOB @ 22' bgs (refusal)	
23						
24						

Attachment 2

Monitoring Well Completion Diagrams

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-500S	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

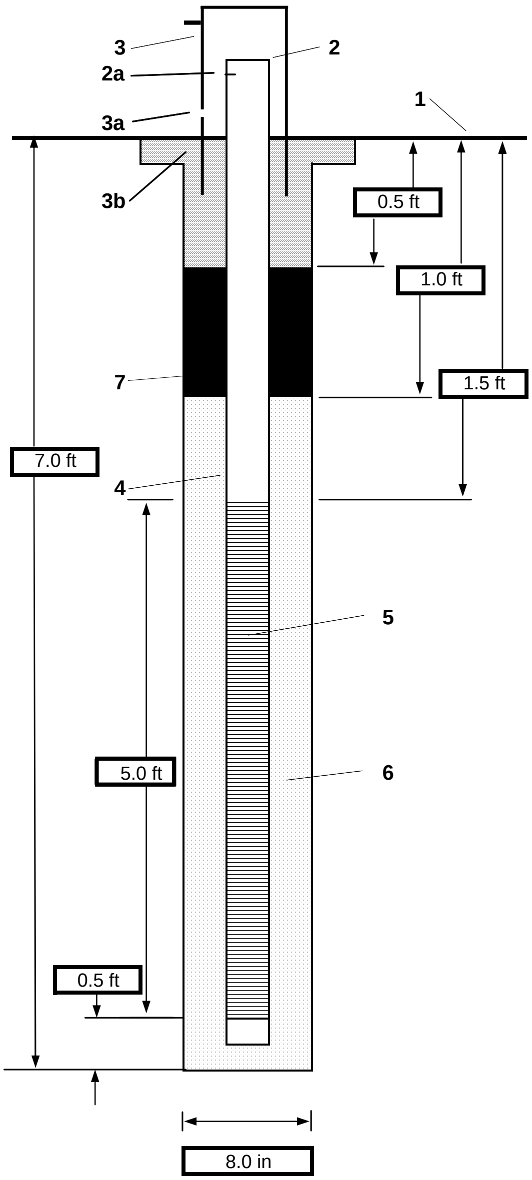
PROJECT : OMC Plant 2

LOCATION : South of northern access road. Replacement wells for well nest MW-4A, MW-4B, MW-4C.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.64 ft btoc START : 3/28/2005 END : 3/28/2005 LOGGER : PR, CL



1- Ground elevation at well: 583.29

2- Top of casing elevation: 586.18
a) vent hole?

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?
b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC 0.010 slot

6- Type screen filter: 10/20 sand
a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used

8- Grout
a) Grout mix used: None
b) Method of placement
c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-500D SHEET 1 OF 1

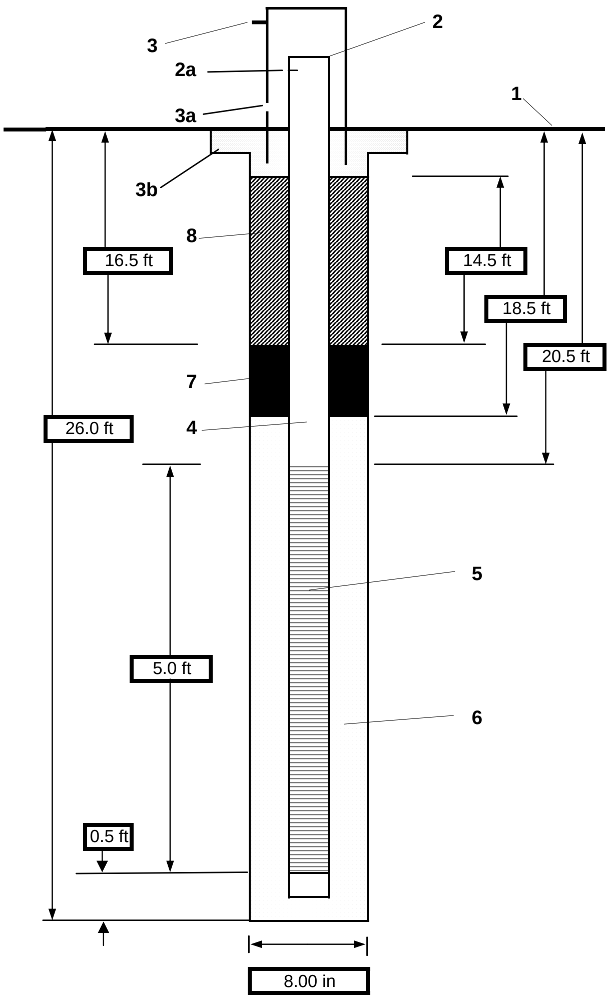
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : South of northern access road. Replacement wells for well nest MW-4A, MW-4B, MW-4C.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.72 ft btoc START : 3/28/2005 END : 3/28/2005 LOGGER : PR, CL



1- Ground elevation at well: 583.65

2- Top of casing elevation: 586.19
a) vent hole?

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?
b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
1 ft of 100 mesh sand above 10/20 sand.
a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used

8- Grout
a) Grout mix used: High solids bentonite grout
b) Method of placement: Tremie
c) Vol. of surface casing grout
d) Vol. of well casing grout

Development method: Pumped

Development time

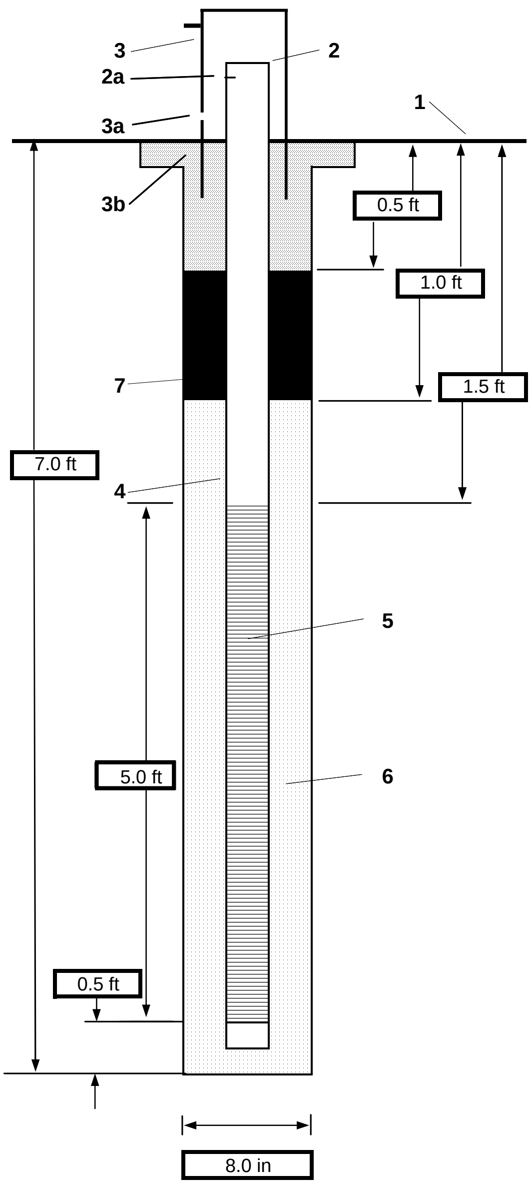
Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-501S	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2
LOCATION : Northeast corner of site. Replacement wells for well nest MW-2A, MW-2B, MW-2C.
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 5.15 ft btoc
START : 4/4/2005
END : 4/4/2005
LOGGER : PR, CL



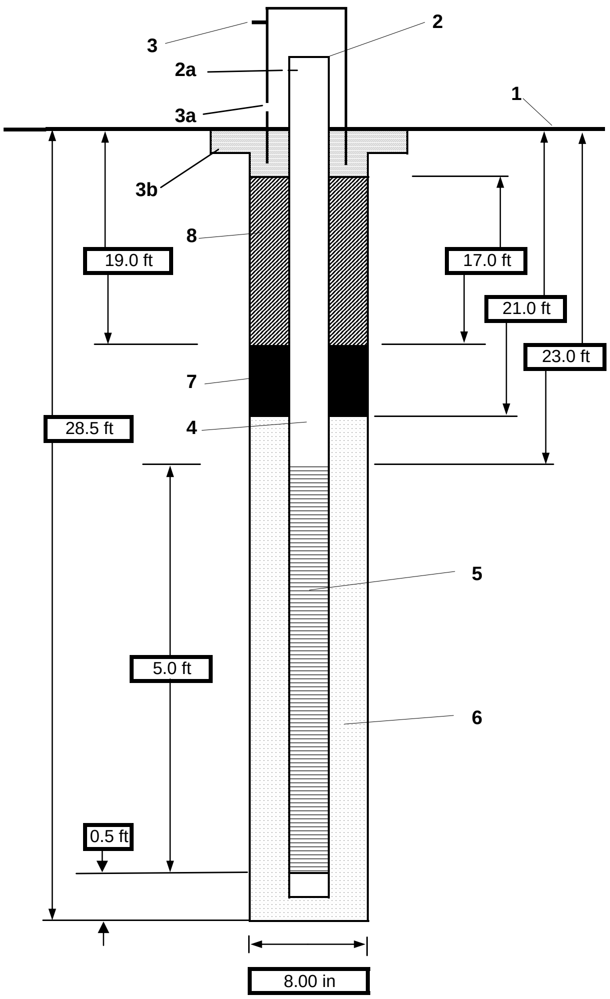
1- Ground elevation at well	583.36
2- Top of casing elevation	585.83
a) vent hole?	
3- Wellhead protection cover type	Locking aluminum well cover
a) weep hole?	
b) concrete pad dimensions	~0.5 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	Bentonite (1/4-inch pellets)
a) Quantity used	
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-501D	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2
LOCATION : Northeast corner of site. Replacement wells for well nest MW-2A, MW-2B, MW-2C.
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 5.10 ft btoc
START : 4/4/2005
END : 4/4/2005
LOGGER : PR, CL



1- Ground elevation at well: 583.29

2- Top of casing elevation: 585.76
a) vent hole?:

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?:
b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
1 ft of 100 mesh sand above 10/20 sand.
a) Quantity used:

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used:

8- Grout
a) Grout mix used: High solids bentonite grout
b) Method of placement: Tremie
c) Vol. of surface casing grout:
d) Vol. of well casing grout:

Development method: Pumped

Development time:

Estimated purge volume:

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-502S	SHEET 1 OF 1

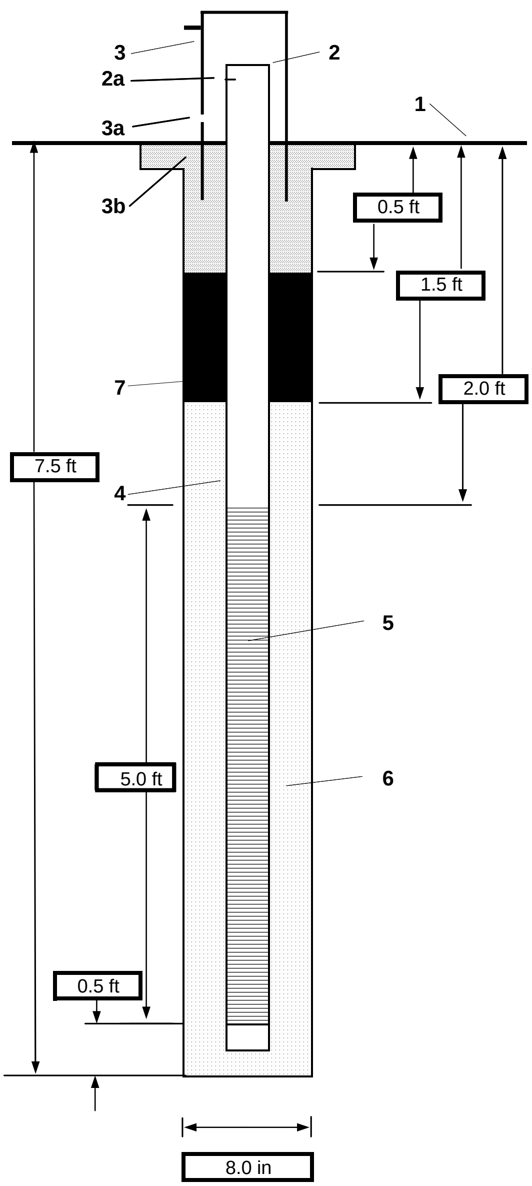
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Outside building near northwest loading dock.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 4.61 ft btoc START : 3/17/2005 END : 3/17/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.93

2- Top of casing elevation: 587.44
a) vent hole?

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?
b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand
a) Quantity used

7- Type of seal: 3/8-inch bentonite chips
a) Quantity used

8- Grout
a) Grout mix used: None
b) Method of placement
c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-502D	SHEET 1 OF 1

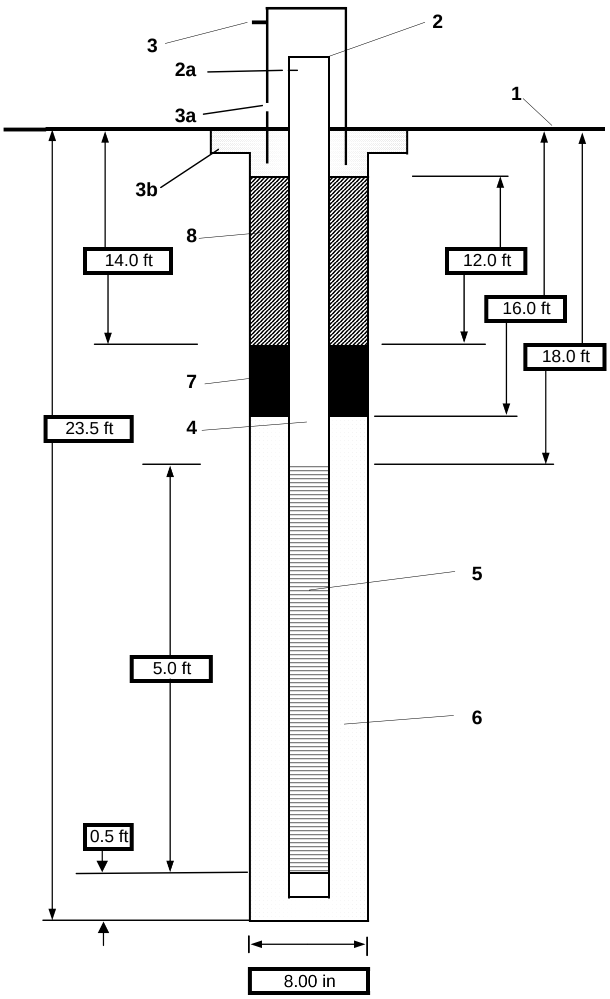
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Outside building near northwest loading dock.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 4.50 ft btoc START : 3/16/2005 END : 3/16/2005 LOGGER : PR, CL



1-	Ground elevation at well	584.84
2-	Top of casing elevation	587.33
	a) vent hole?	
3-	Wellhead protection cover type	Locking aluminum well cover
	a) weep hole?	
	b) concrete pad dimensions	~2 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	**MW-503S** SHEET 1 OF 1

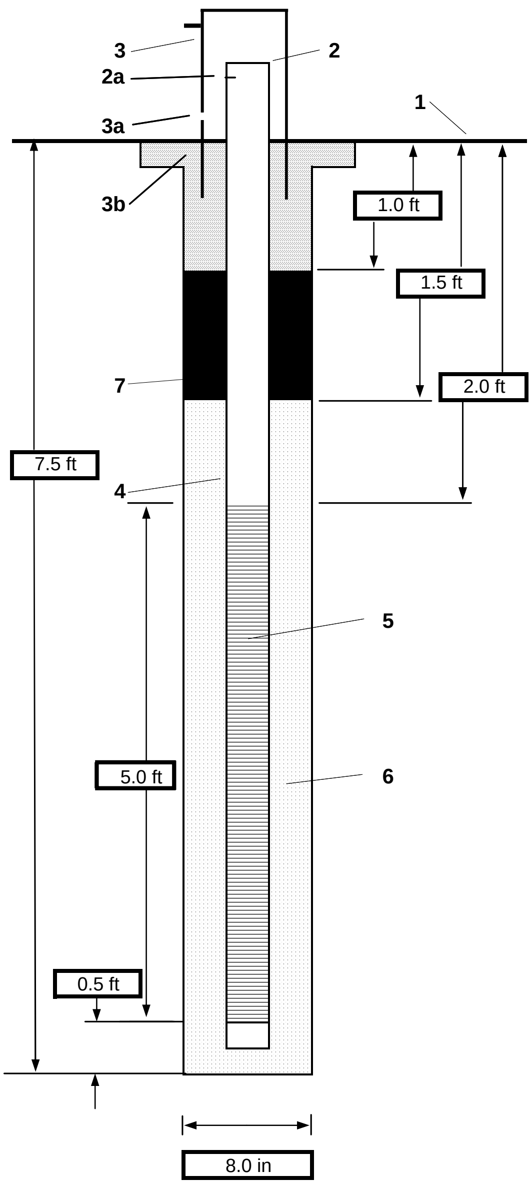
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of chip wringer room.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.25 ft btoc START : 3/16/2005 END : 3/16/2005 LOGGER : PR, CL



1- Ground elevation at well	584.91
2- Top of casing elevation	584.66
a) vent hole?	
3- Wellhead protection cover type	Flush mount
a) weep hole?	
b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	3/8-inch bentonite chips overlying
a) Quantity used	0.5 feet of 1/4-inch bentonite pellets
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	**MW-503D**	SHEET 1	OF 1

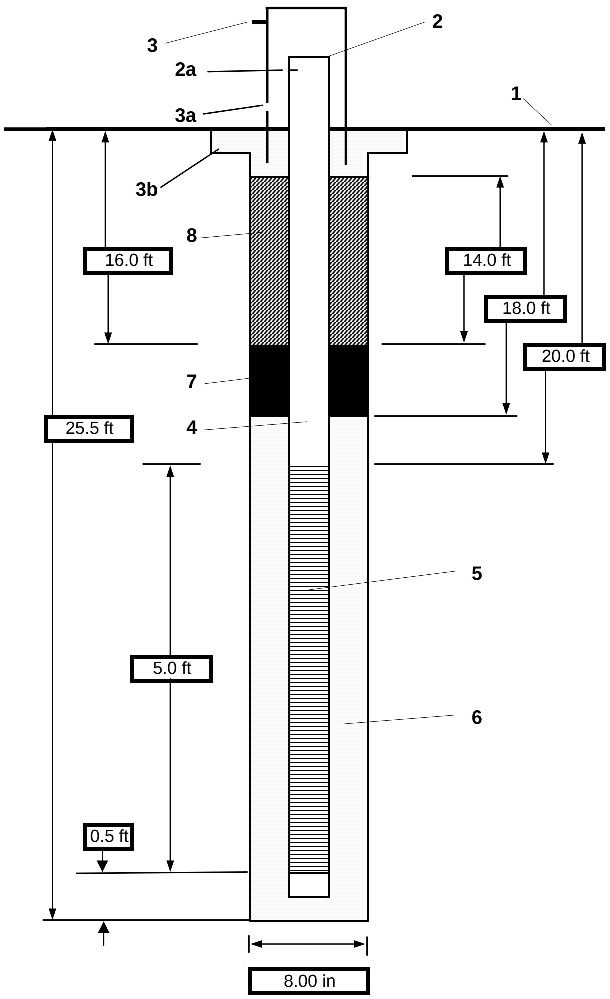
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of chip wringer room.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.20 ft btoc START : 3/16/2005 END : 3/16/2005 LOGGER : PR, CL



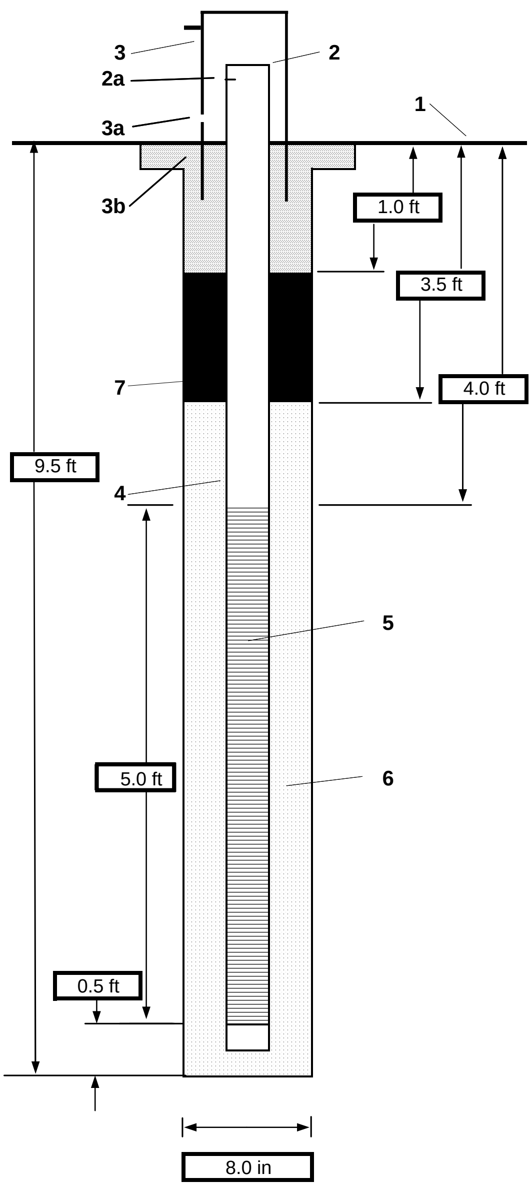
1- Ground elevation at well	584.86
2- Top of casing elevation	584.63
a) vent hole?	
3- Wellhead protection cover type	Flush mount
a) weep hole?	
b) concrete pad dimensions	~2 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
a) Quantity used	
7- Type of seal	Bentonite (1/4-inch pellets)
a) Quantity used	
8- Grout	
a) Grout mix used	High solids bentonite grout
b) Method of placement	Tremie
c) Vol. of surface casing grout	
d) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-504S	SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant near northeastern loading dock of Old Die Cast Area
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 6.02 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1- Ground elevation at well	588.42
2- Top of casing elevation	588.23
a) vent hole?	
3- Wellhead protection cover type	Flush mount
a) weep hole?	
b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	3/8-inch bentonite chips overlying
a) Quantity used	0.5 feet of 1/4-inch bentonite pellets
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

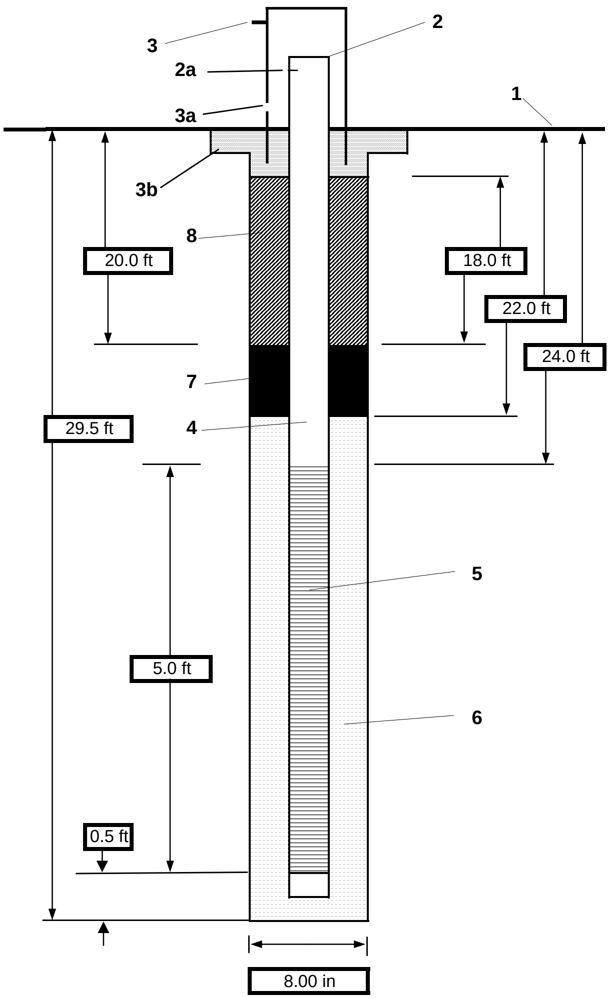
Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-504D SHEET 1 OF 1

CH2MHILL

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant near northeastern loading dock of Old Die Cast Area
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 5.93 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1-	Ground elevation at well	588.42
2-	Top of casing elevation	588.16
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~2 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-505S SHEET 1 OF 1

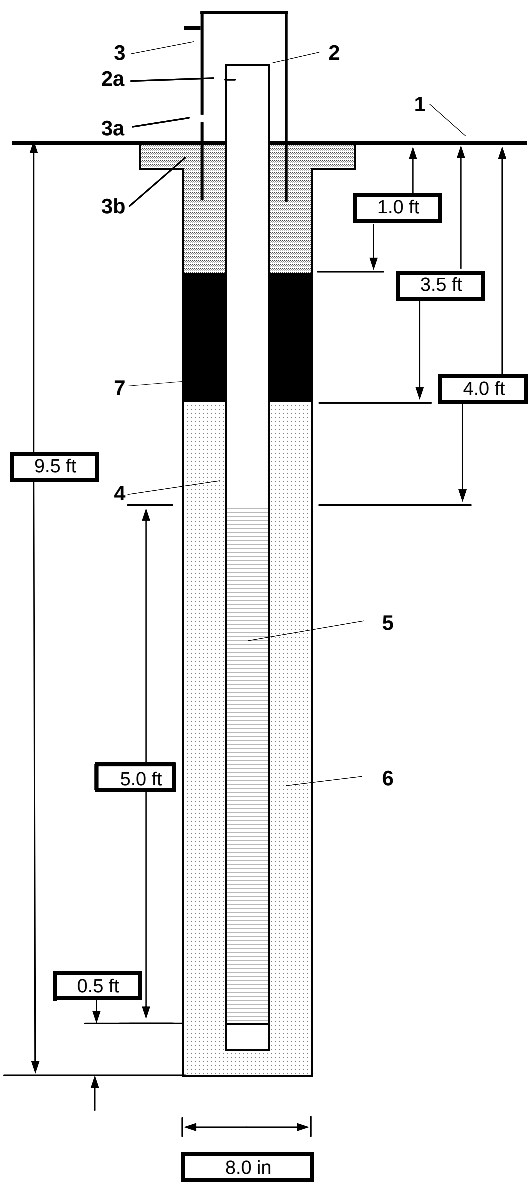
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, west of production offices near transformer.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.51 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1-	Ground elevation at well	588.36
2-	Top of casing elevation	588.13
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand
	a) Quantity used	
7-	Type of seal	3/8-inch bentonite chips overlying
	a) Quantity used	0.5 feet of 1/4-inch bentonite pellets
8-	Grout	
	a) Grout mix used	None
	b) Method of placement	
	c) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

CH2MHILL

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-505D	SHEET 1	OF 1

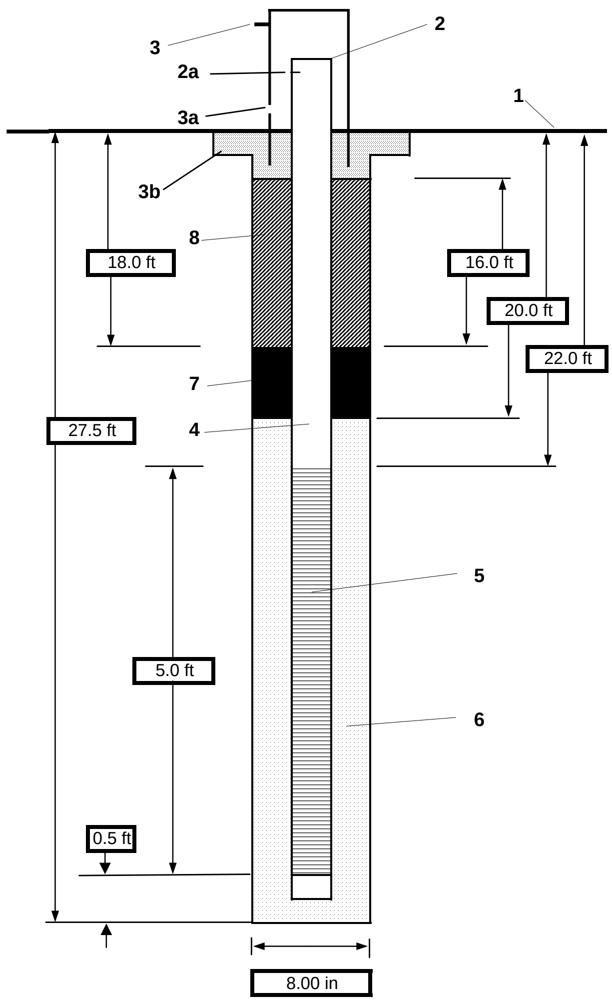
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, west of production offices near transformer.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.31 ft btoc START : 3/25/2005 END : 3/25/2005 LOGGER : PR, CL



1- Ground elevation at well: 588.36

2- Top of casing elevation: 587.97
   a) vent hole?

3- Wellhead protection cover type: Flush mount
   a) weep hole?
   b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
   1 ft of 100 mesh sand above 10/20 sand.
   a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
   a) Quantity used

8- Grout
   a) Grout mix used: High solids bentonite grout
   b) Method of placement: Tremie
   c) Vol. of surface casing grout
   d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-506S	SHEET 1	OF 1

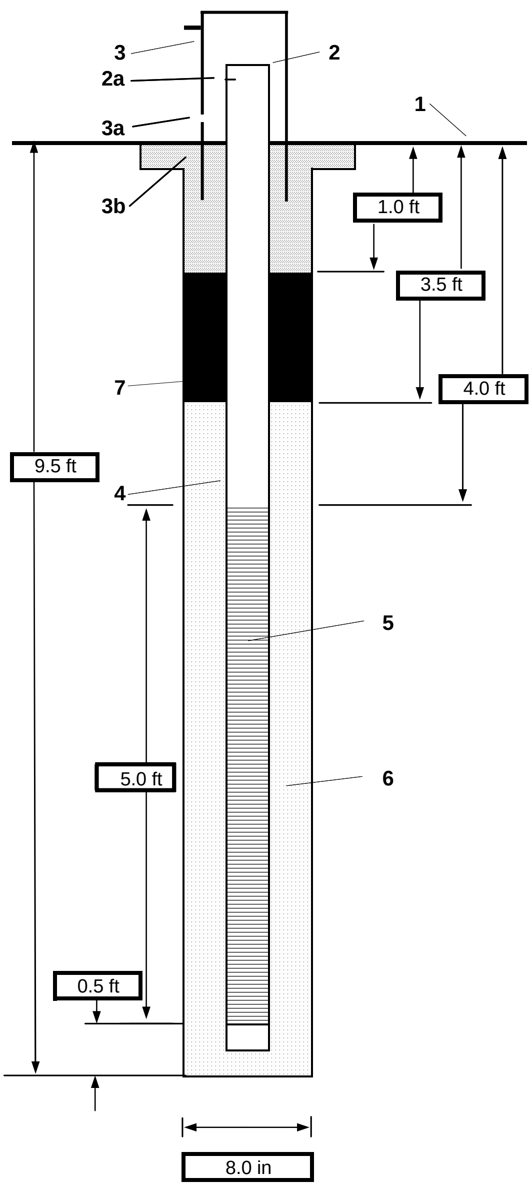
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, in hallway just north of Metal Plating Room.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.78 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1-	Ground elevation at well	588.42
2-	Top of casing elevation	588.18
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand
	a) Quantity used	
7-	Type of seal	3/8-inch bentonite chips overlying
	a) Quantity used	0.5 feet of 1/4-inch bentonite pellets
8-	Grout	
	a) Grout mix used	None
	b) Method of placement	
	c) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-506D SHEET 1 OF 1

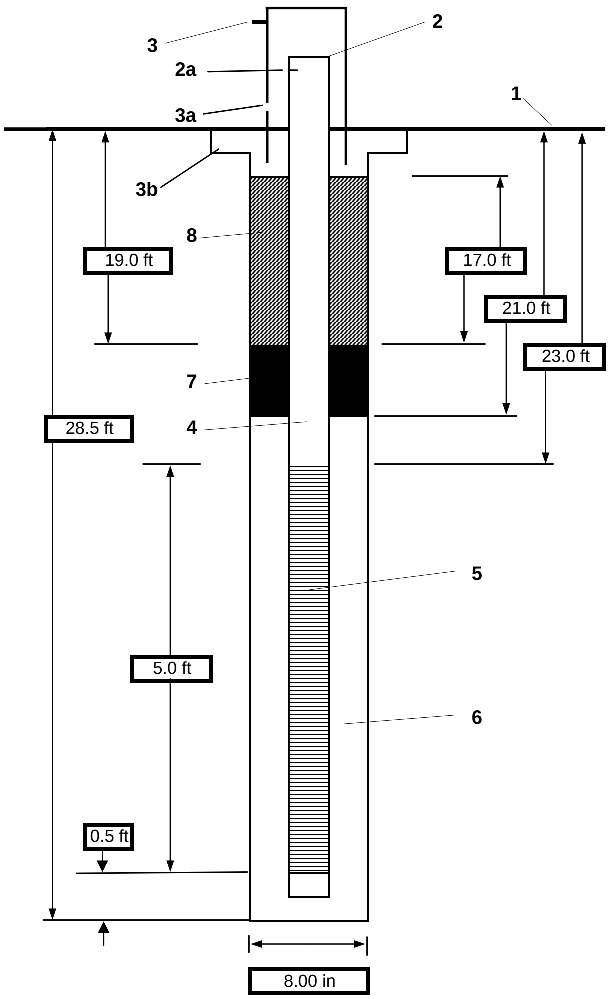
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2   LOCATION : Inside plant, in hallway just north of Metal Plating Room.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.77 ft btoc   START : 3/25/2005   END : 3/25/2005   LOGGER : PR, CL



1- Ground elevation at well: 588.42

2- Top of casing elevation: 588.19
   a) vent hole?

3- Wellhead protection cover type: Flush mount
   a) weep hole?
   b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand to 2 ft above screen.
   a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
   a) Quantity used

8- Grout
   a) Grout mix used: High solids bentonite grout
   b) Method of placement: Tremie
   c) Vol. of surface casing grout
   d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-507S	SHEET 1 OF 1

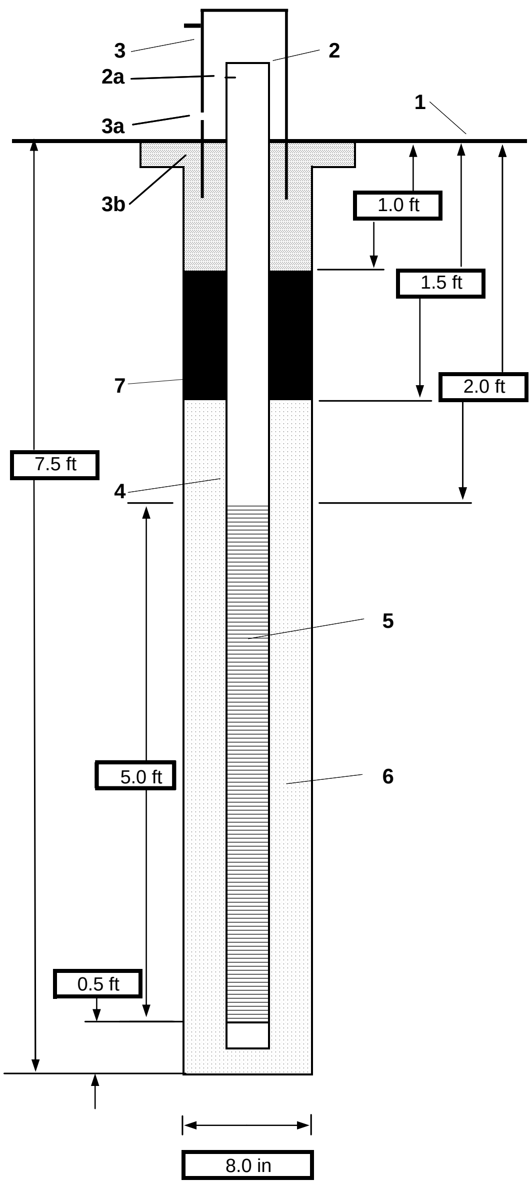
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : North of Trim Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 4.32 ft btoc START : 3/15/2005 END : 3/15/2005 LOGGER : PR, CL



1-	Ground elevation at well	583.88
2-	Top of casing elevation	586.32
	a) vent hole?	
3-	Wellhead protection cover type	Locking aluminum well cover
	a) weep hole?	
	b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand
	a) Quantity used	
7-	Type of seal	3/8-inch bentonite chips
	a) Quantity used	
8-	Grout	
	a) Grout mix used	None
	b) Method of placement	
	c) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

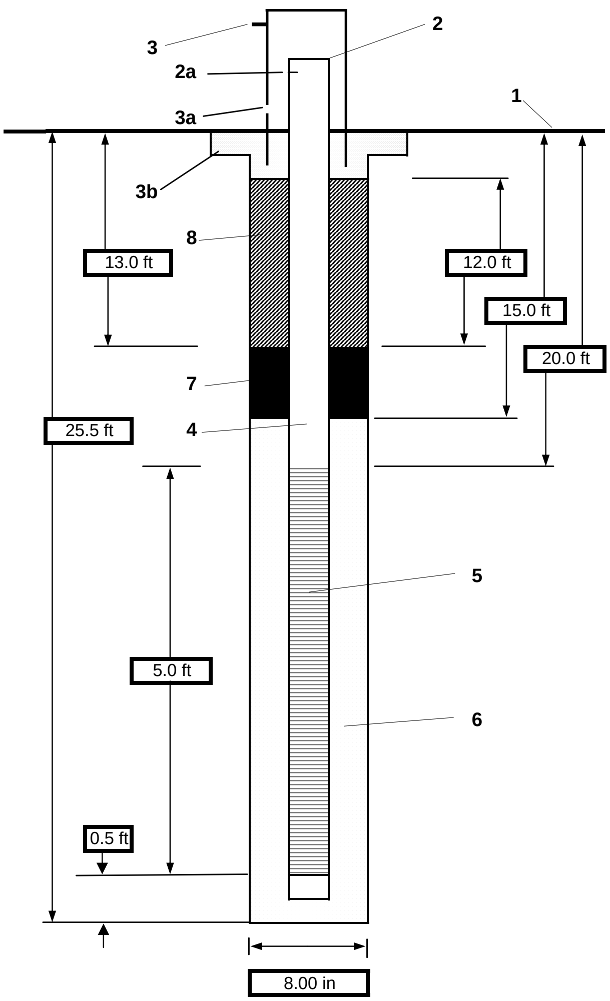
Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

CH2MHILL

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-507D	SHEET 1	OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : North of Trim Building
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 4.38 ft btoc START : 3/15/2005 END : 3/15/2005 LOGGER : PR, CL



1- Ground elevation at well: 583.93

2- Top of casing elevation: 586.34
a) vent hole?

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?
b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC, 0.010 slot

6- Type screen filter: 10/20 sand to 5 ft above screen.
a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used

8- Grout
a) Grout mix used: High solids bentonite grout
b) Method of placement: Tremie
c) Vol. of surface casing grout
d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-508S	SHEET 1 OF 1

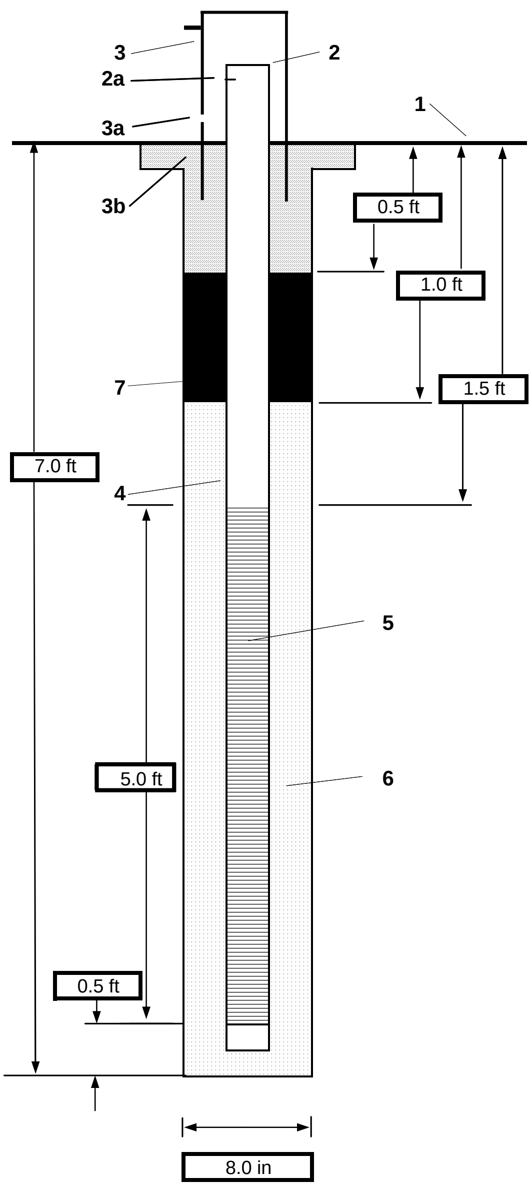
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Along eastern access road.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.51 ft btoc START : 3/22/2005 END : 3/22/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.93

2- Top of casing elevation: 584.67
a) vent hole?

3- Wellhead protection cover type: Flush mount
a) weep hole?
b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand
a) Quantity used

7- Type of seal: 3/8-inch bentonite chips
a) Quantity used

8- Grout
a) Grout mix used: None
b) Method of placement
c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-508D	SHEET 1	OF 1

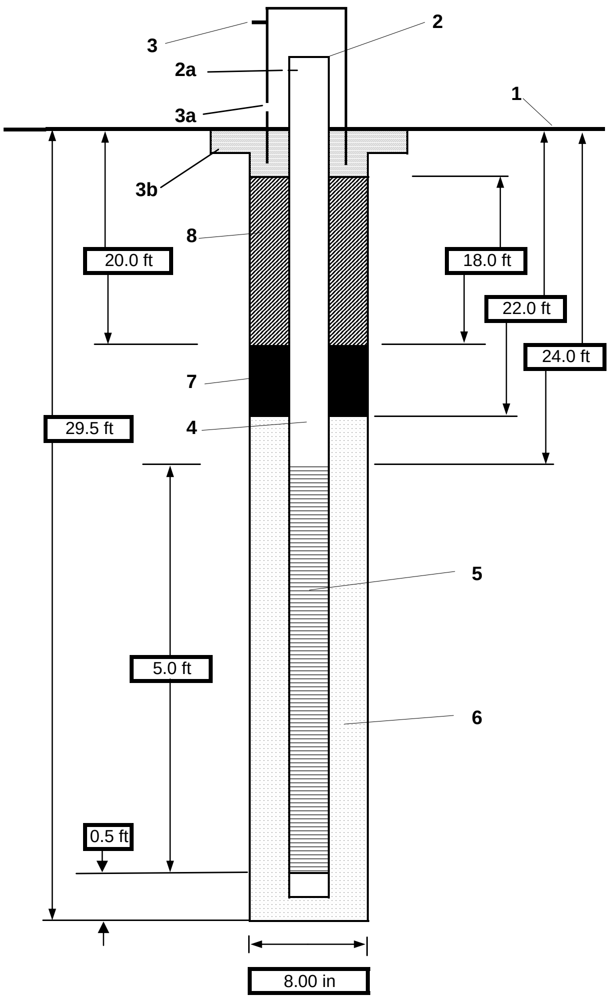
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Along eastern access road.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.51 ft btoc START : 3/22/2005 END : 3/22/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.96

2- Top of casing elevation: 584.68
a) vent hole?

3- Wellhead protection cover type: Flush mount
a) weep hole?
b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
1 ft of 100 mesh sand above 10/20 sand.
a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used

8- Grout
a) Grout mix used: High solids bentonite grout
b) Method of placement: Tremie
c) Vol. of surface casing grout
d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-509S	SHEET 1 OF 1

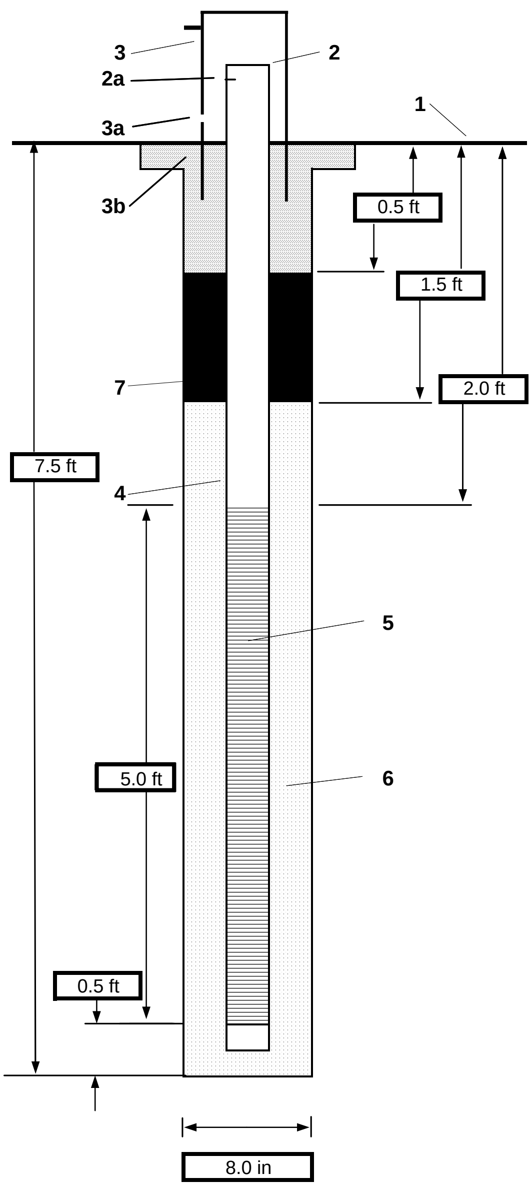
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Along western access road, west of boiler room

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 0.90 ft btoc START : 3/22/2005 END : 3/22/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.42

2- Top of casing elevation: 584.22
a) vent hole?:

3- Wellhead protection cover type: Locking aluminum well cover
a) weep hole?:
b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand
a) Quantity used:

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used:

8- Grout
a) Grout mix used: None
b) Method of placement:
c) Vol. of well casing grout:

Development method: Pumped

Development time:

Estimated purge volume:

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-509D	SHEET 1 OF 1

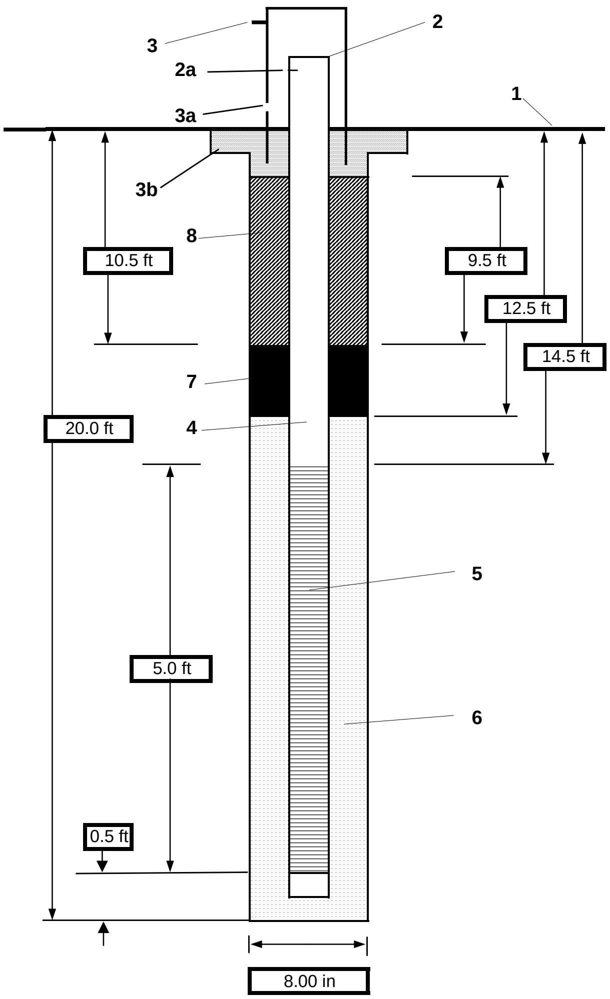
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Along western access road, west of boiler room

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 0.89 ft btoc START : 3/22/2005 END : 3/22/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.41

2- Top of casing elevation: 584.19
   a) vent hole?

3- Wellhead protection cover type: Flush mount
   a) weep hole?
   b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
   1 ft of 100 mesh sand above 10/20 sand.
   a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
   a) Quantity used

8- Grout
   a) Grout mix used: High solids bentonite grout
   b) Method of placement: Tremie
   c) Vol. of surface casing grout
   d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-510S	SHEET 1	OF 1

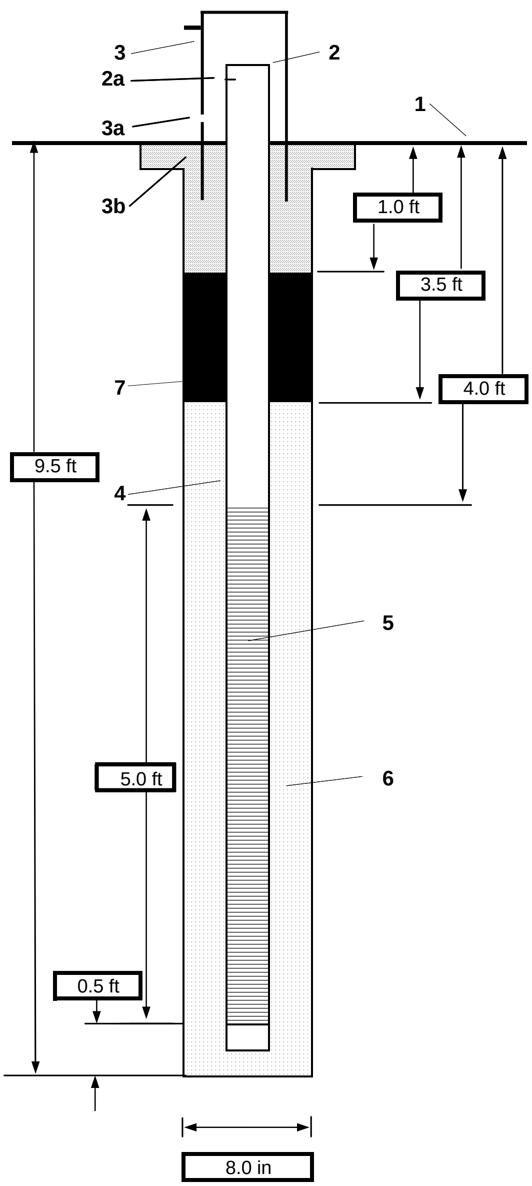
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, north of nurse's station.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.81 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1- Ground elevation at well	588.33
2- Top of casing elevation	588.05
a) vent hole?	
3- Wellhead protection cover type	Flush mount
a) weep hole?	
b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	3/8-inch bentonite chips overlying
a) Quantity used	0.5 feet of 1/4-inch bentonite pellets
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-510D	SHEET 1 OF 1

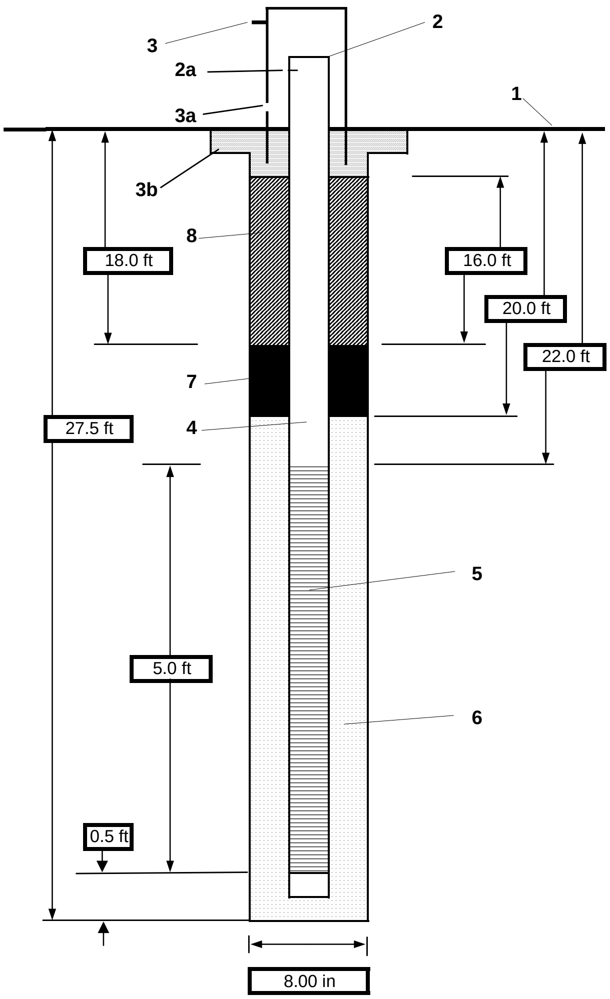
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 — LOCATION : Inside plant, north of nurse's station.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 5.81 ft btoc — START : 4/4/2005 — END : 4/4/2005 — LOGGER : PR, CL



1-	Ground elevation at well	588.33
2-	Top of casing elevation	588.07
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~2 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-511S	SHEET 1	OF 1

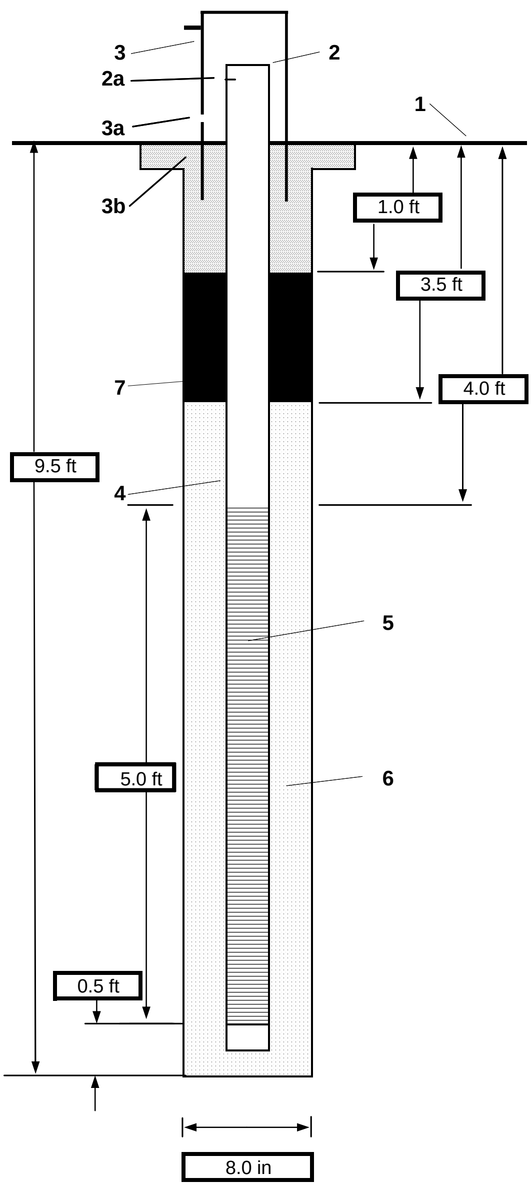
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, just west of Trim Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 6.27 ft btoc START : 3/18/2005 END : 3/18/2005 LOGGER : PR, CL



1- Ground elevation at well: 588.41

2- Top of casing elevation: 588.15
   a) vent hole?

3- Wellhead protection cover type: Flush mount
   a) weep hole?
   b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand
   a) Quantity used

7- Type of seal: 3/8-inch bentonite chips overlying
   a) Quantity used: 0.5 feet of 1/4-inch bentonite pellets

8- Grout
   a) Grout mix used: None
   b) Method of placement
   c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-511D SHEET 1 OF 1

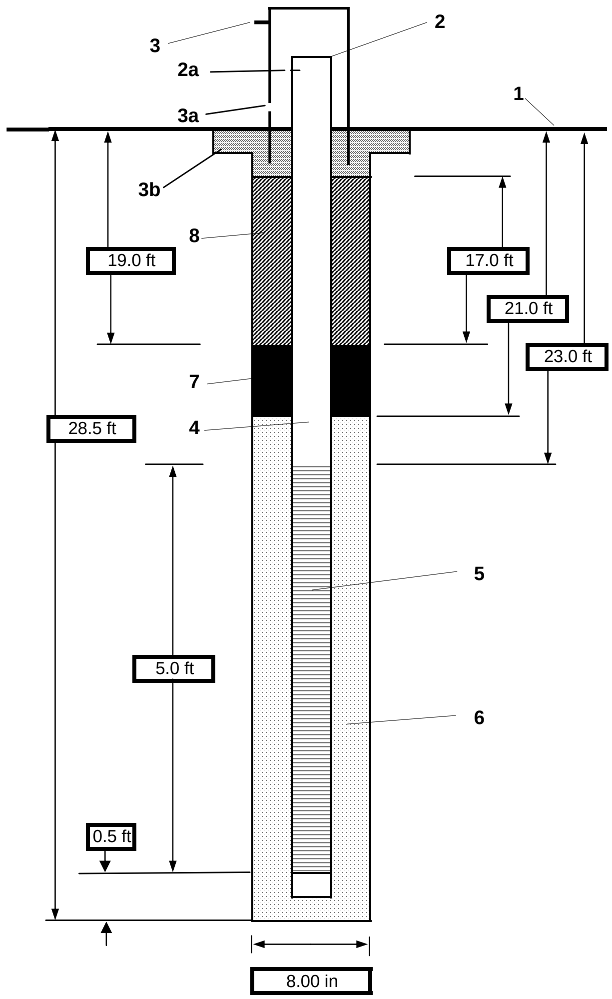
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Inside plant, just west of Trim Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 6.33 ft btoc START : 3/25/2005 END : 3/25/2005 LOGGER : PR, CL



1-	Ground elevation at well	588.41
2-	Top of casing elevation	588.22
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~2 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-512S	SHEET 1	OF 1

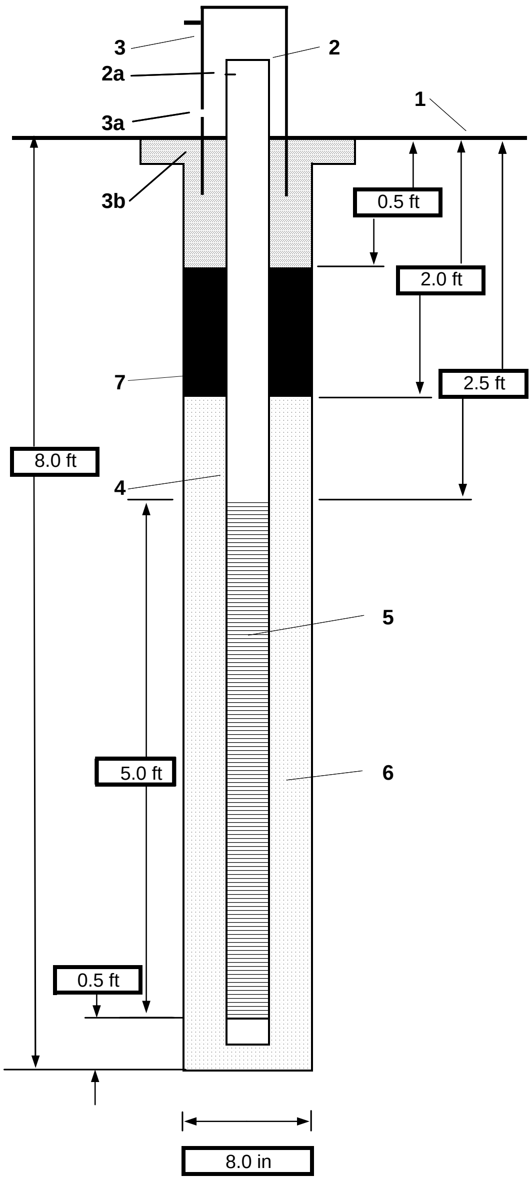
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : South of Triax Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.80 ft btoc START : 3/31/2005 END : 3/31/2005 LOGGER : PR, CL



1- Ground elevation at well	584.83
2- Top of casing elevation	584.56
a) vent hole?	
3- Wellhead protection cover type	Flush mount
a) weep hole?	
b) concrete pad dimensions	~0.5 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	Bentonite (1/4-inch pellets)
a) Quantity used	
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-512D	SHEET 1	OF 1

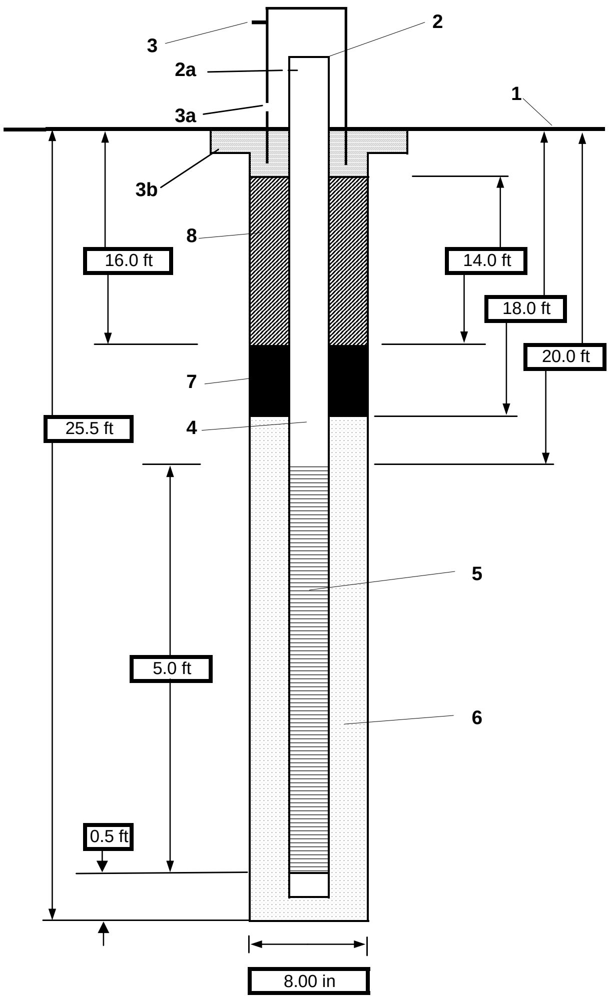
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : South of Triax Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.86 ft btoc START : 3/31/2005 END : 3/31/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.86

2- Top of casing elevation: 584.60
   a) vent hole?

3- Wellhead protection cover type: Flush mount
   a) weep hole?
   b) concrete pad dimensions: ~2 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
   1 ft of 100 mesh sand above 10/20 sand.
   a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
   a) Quantity used

8- Grout
   a) Grout mix used: High solids bentonite grout
   b) Method of placement: Tremie
   c) Vol. of surface casing grout
   d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-513S	SHEET 1 OF 1

CH2MHILL

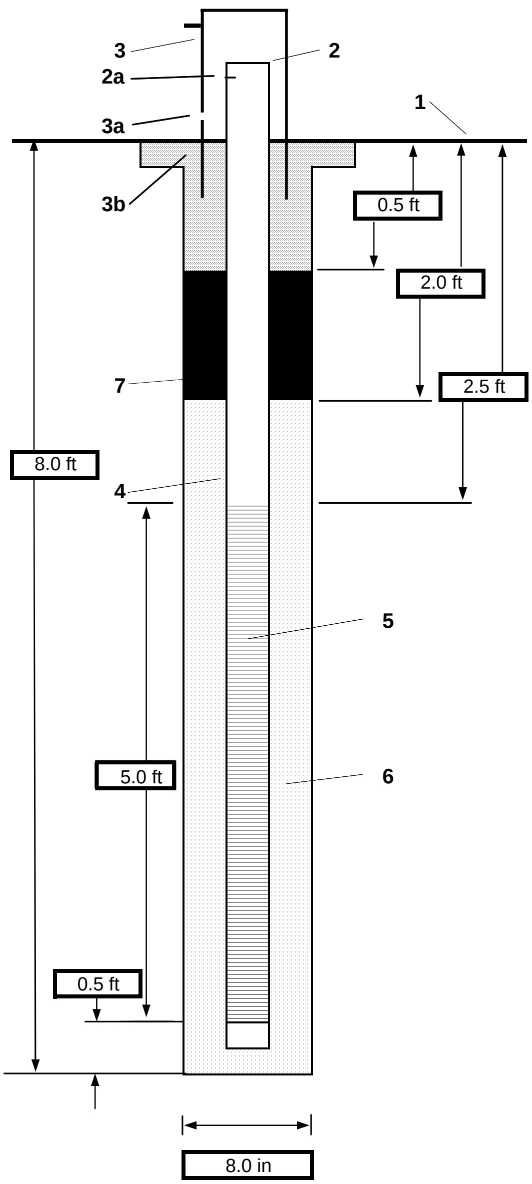
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : West of Corporate Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.49 ft btoc START : 3/30/2005 END : 3/30/2005 LOGGER : PR, CL



1- Ground elevation at well: 585.44

2- Top of casing elevation: 585.23
a) vent hole?:

3- Wellhead protection cover type: Flush mount
a) weep hole?:
b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand
a) Quantity used:

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used:

8- Grout
a) Grout mix used: None
b) Method of placement:
c) Vol. of well casing grout:

Development method: Pumped

Development time:

Estimated purge volume:

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-513D	SHEET 1	OF 1

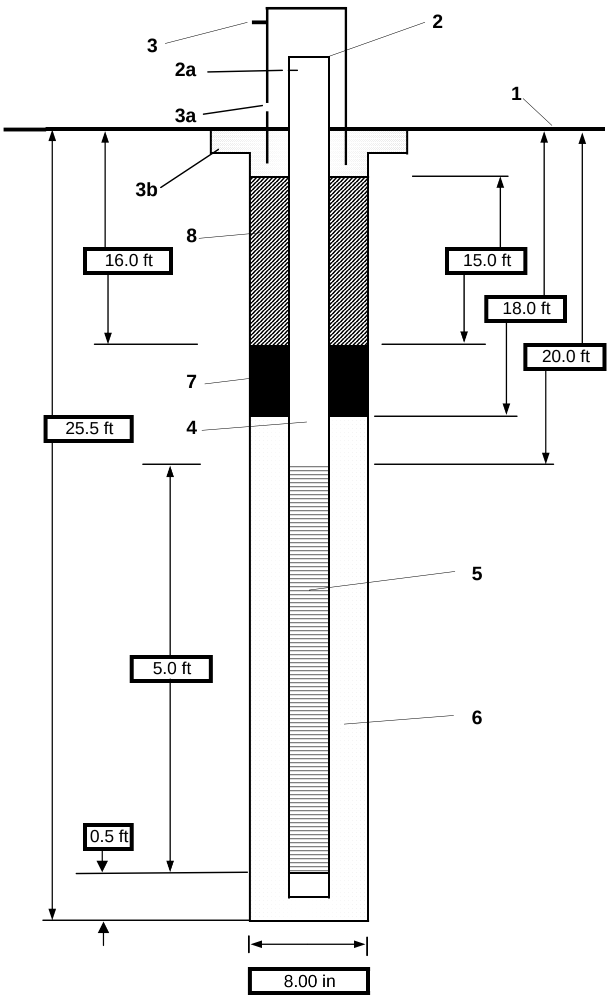
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 — LOCATION : West of Corporate Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.51 ft btoc — START : 3/30/2005 — END : 3/30/2005 — LOGGER : PR, CL



1-	Ground elevation at well	585.54
2-	Top of casing elevation	585.29
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-514S	SHEET 1	OF 1

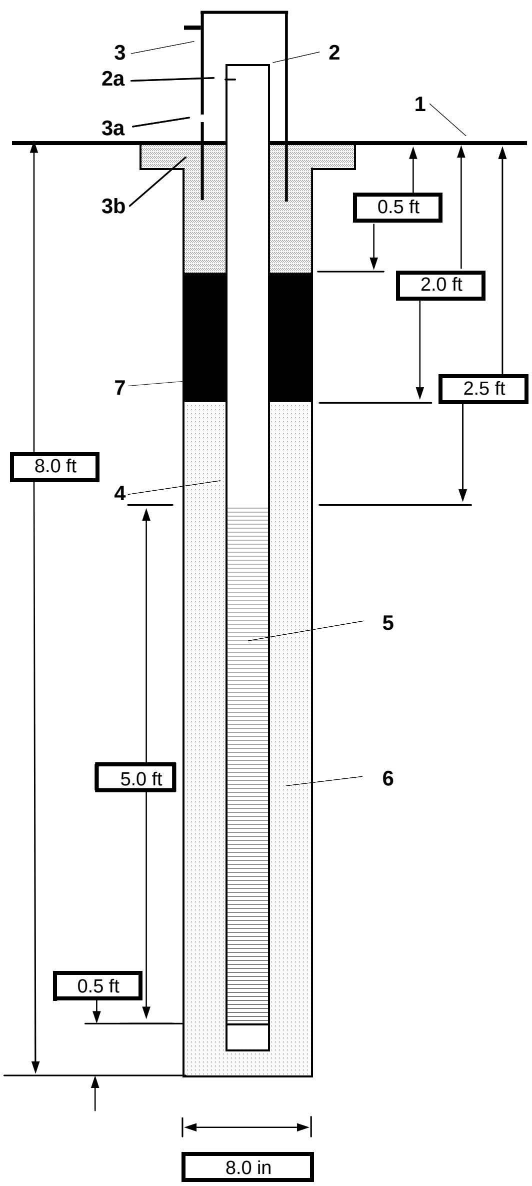
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of Corporate Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.22 ft btoc START : 3/30/2005 END : 3/30/2005 LOGGER : PR, CL



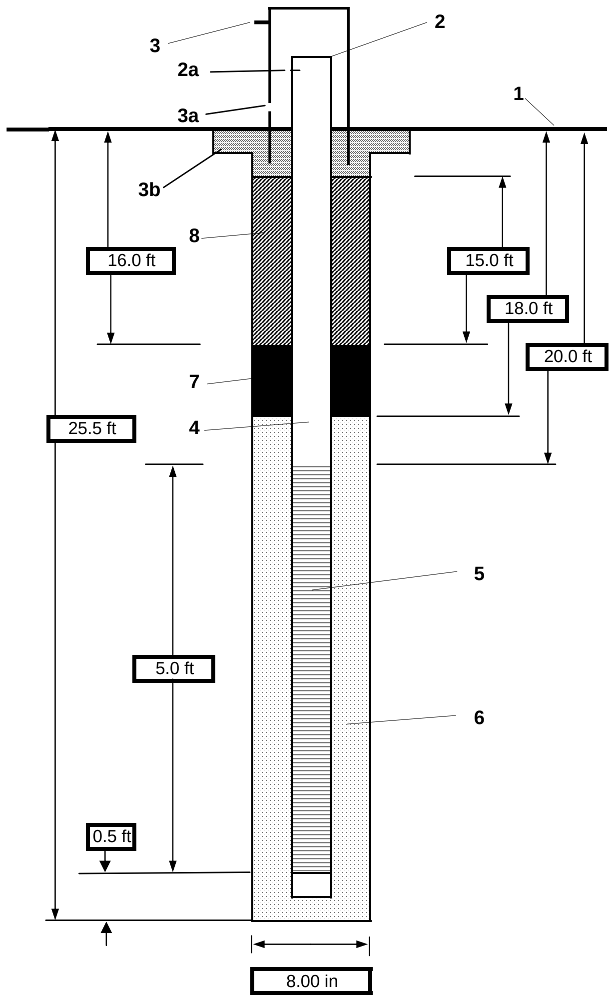
1-	Ground elevation at well	584.89
2-	Top of casing elevation	584.70
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~0.5 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	None
	b) Method of placement	
	c) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-514D SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of Corporate Building
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 3.23 ft btoc START : 3/30/2005 END : 3/30/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.92

2- Top of casing elevation: 584.70
a) vent hole?

3- Wellhead protection cover type: Flush mount
a) weep hole?
b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
1 ft of 100 mesh sand above 10/20 sand.
a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
a) Quantity used

8- Grout
a) Grout mix used: High solids bentonite grout
b) Method of placement: Tremie
c) Vol. of surface casing grout
d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-515S	SHEET 1 OF 1

CH2MHILL

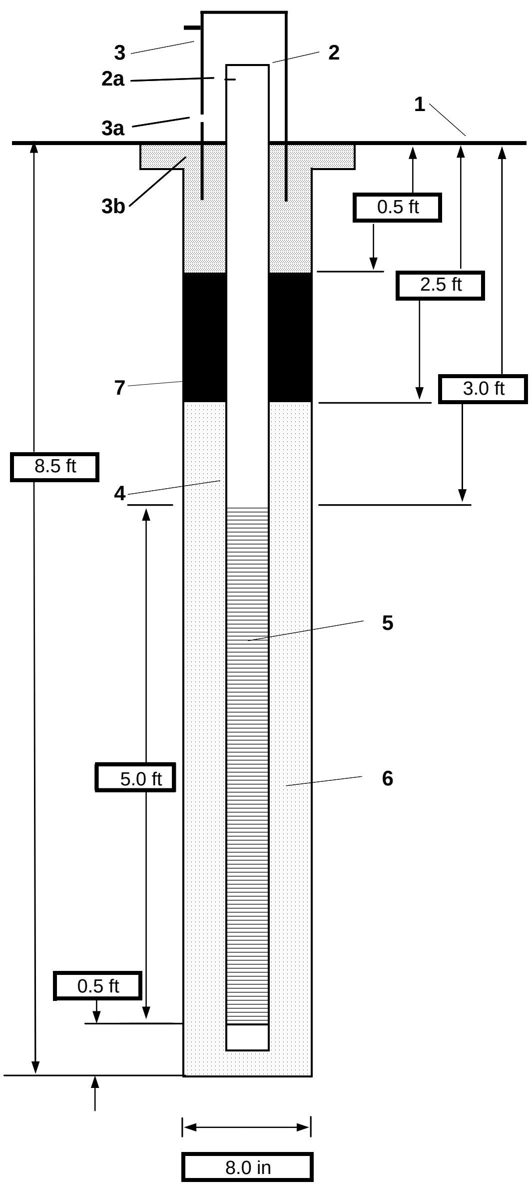
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : South of Triax Building along Seahorse Drive.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.24 ft btoc START : 3/31/2005 END : 3/31/2005 LOGGER : PR, CL



1- Ground elevation at well: 583.97

2- Top of casing elevation: 583.71

a) vent hole?

3- Wellhead protection cover type: Flush mount

a) weep hole?

b) concrete pad dimensions: ~0.5 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC, 0.010 slot

6- Type screen filter: 10/20 sand

a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)

a) Quantity used

8- Grout

a) Grout mix used: None

b) Method of placement

c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

CH2MHILL

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-515D	SHEET 1	OF 1

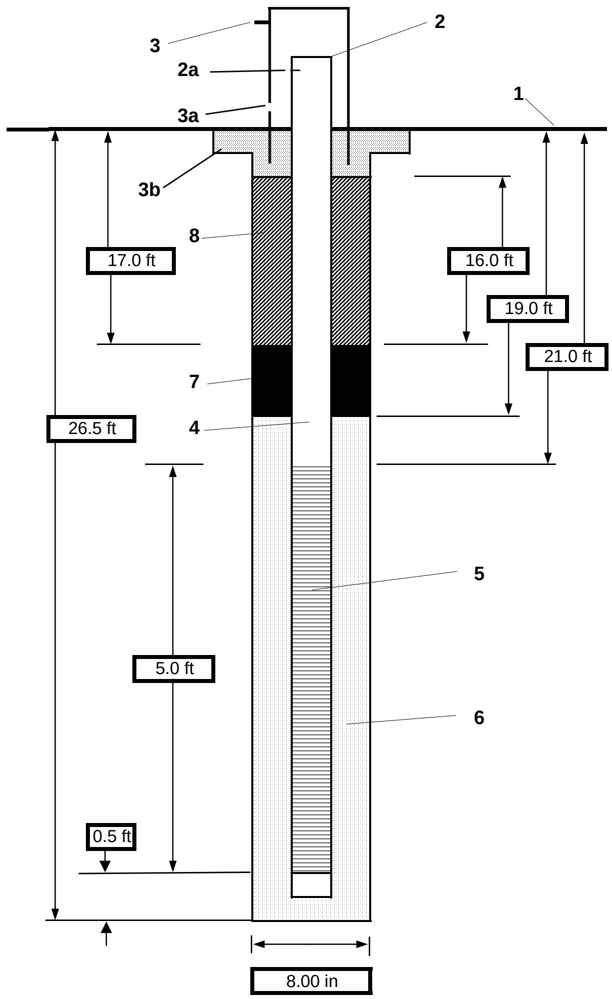
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : South of Triax Building along Seahorse Drive.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 2.19 ft btoc START : 3/31/2005 END : 3/31/2005 LOGGER : PR, CL



1- Ground elevation at well: 583.88

2- Top of casing elevation: 583.58
 a) vent hole?

3- Wellhead protection cover type: Flush mount
 a) weep hole?
 b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
 0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
 1 ft of 100 mesh sand above 10/20 sand.
 a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
 a) Quantity used

8- Grout
 a) Grout mix used: High solids bentonite grout
 b) Method of placement: Tremie
 c) Vol. of surface casing grout
 d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-516S	SHEET 1 OF 1

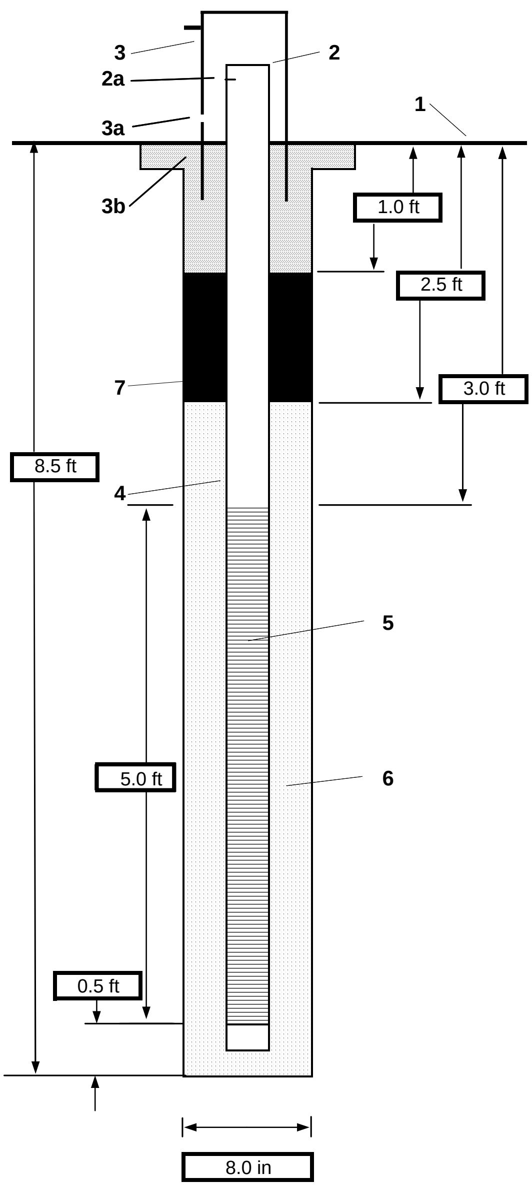
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Larsen Marine property, east of I/O Building.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.60 ft btoc START : 3/29/2005 END : 3/29/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.08

2- Top of casing elevation: 583.80
  a) vent hole?

3- Wellhead protection cover type: Flush mount
  a) weep hole?
  b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
0.010 slot

6- Type screen filter: 10/20 sand
  a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
  a) Quantity used

8- Grout
  a) Grout mix used: None
  b) Method of placement
  c) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments: 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER		
186305.FI.01	MW-516D	SHEET 1	OF 1

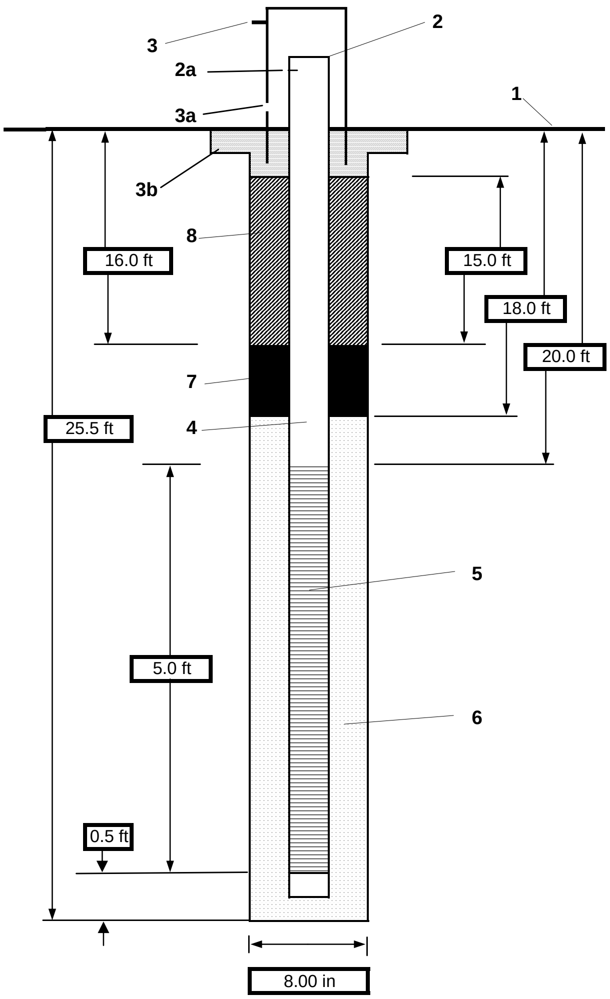
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : Larsen Marine property, east of I/O Building.

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 3.61 ft btoc START : 3/29/2005 END : 3/29/2005 LOGGER : PR, CL



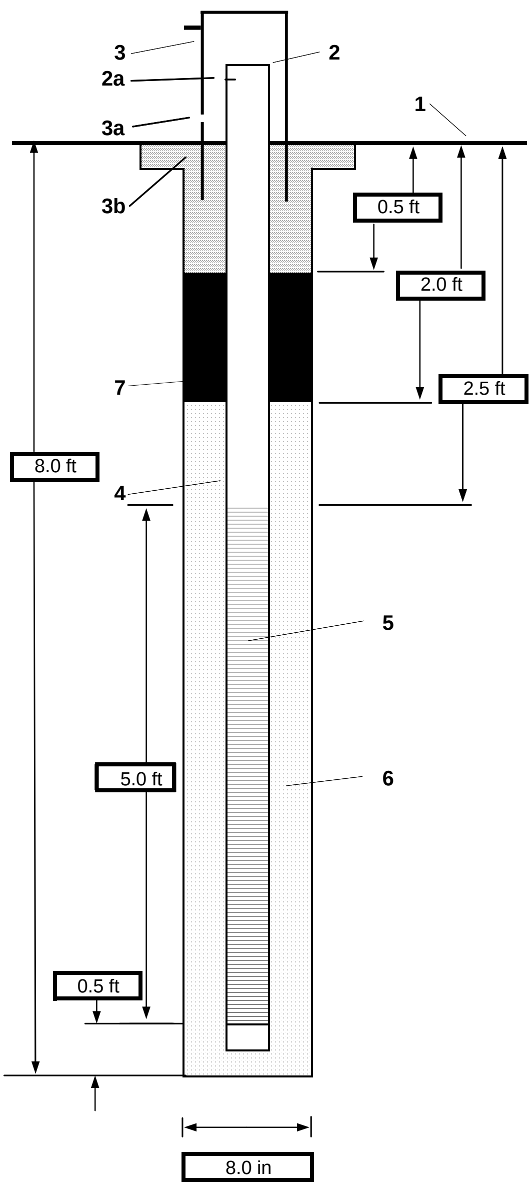
1-	Ground elevation at well	584.04
2-	Top of casing elevation	583.78
	a) vent hole?	
3-	Wellhead protection cover type	Flush mount
	a) weep hole?	
	b) concrete pad dimensions	~1 ft x 2 ft x 2 ft
4-	Dia./type of well casing	2 in diameter schedule 40 PVC
5-	Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6-	Type screen filter	10/20 sand to 1 ft above screen. 1 ft of 100 mesh sand above 10/20 sand.
	a) Quantity used	
7-	Type of seal	Bentonite (1/4-inch pellets)
	a) Quantity used	
8-	Grout	
	a) Grout mix used	High solids bentonite grout
	b) Method of placement	Tremie
	c) Vol. of surface casing grout	
	d) Vol. of well casing grout	
	Development method	Pumped
	Development time	
	Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

PROJECT NUMBER	WELL NUMBER
186305.FI.01	MW-517S SHEET 1 OF 1

WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of HAZMAT Storage Building
DRILLING CONTRACTOR : IPS
DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger
WATER LEVELS : 4.09 ft btoc START : 4/1/2005 END : 4/1/2005 LOGGER : PR, CL



1- Ground elevation at well	584.18
2- Top of casing elevation	586.64
a) vent hole?	
3- Wellhead protection cover type	Locking aluminum well cover
a) weep hole?	
b) concrete pad dimensions	~0.5 ft x 2 ft x 2 ft
4- Dia./type of well casing	2 in diameter schedule 40 PVC
5- Type/slot size of screen	2 in diameter schedule 40 PVC 0.010 slot
6- Type screen filter	10/20 sand
a) Quantity used	
7- Type of seal	3/8-inch bentonite chips
a) Quantity used	
8- Grout	
a) Grout mix used	None
b) Method of placement	
c) Vol. of well casing grout	
Development method	Pumped
Development time	
Estimated purge volume	

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

CH2MHILL

PROJECT NUMBER	WELL NUMBER	
186305.FI.01	MW-517D	SHEET 1 OF 1

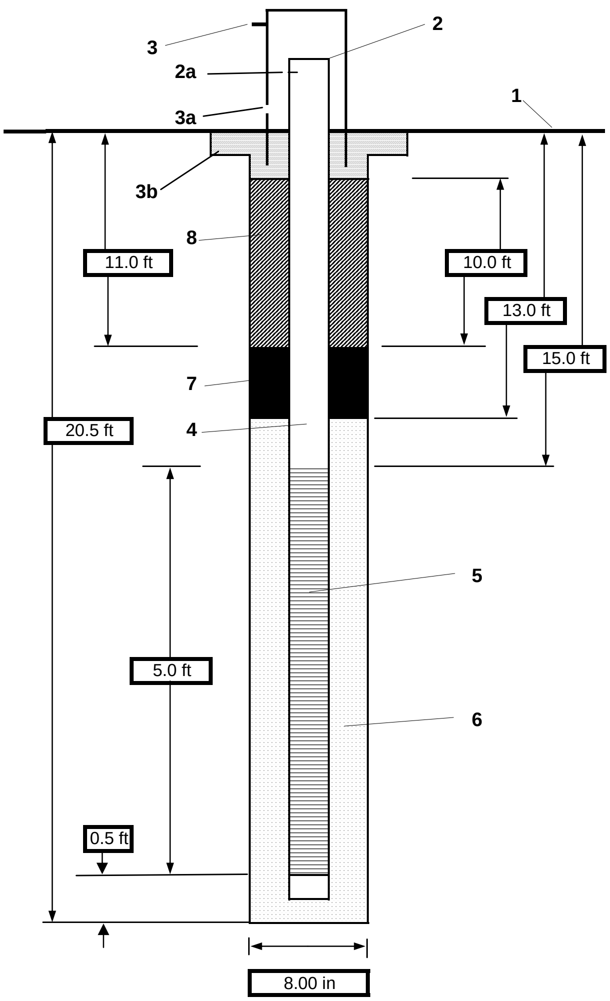
WELL COMPLETION DIAGRAM

PROJECT : OMC Plant 2 LOCATION : East of HAZMAT Storage Building

DRILLING CONTRACTOR : IPS

DRILLING METHOD AND EQUIPMENT USED : 4.25-inch I.D. Hollow Stem Auger

WATER LEVELS : 4.07 ft btoc START : 4/1/2005 END : 4/1/2005 LOGGER : PR, CL



1- Ground elevation at well: 584.19

2- Top of casing elevation: 586.64
   a) vent hole?

3- Wellhead protection cover type: Locking aluminum well cover
   a) weep hole?
   b) concrete pad dimensions: ~1 ft x 2 ft x 2 ft

4- Dia./type of well casing: 2 in diameter schedule 40 PVC

5- Type/slot size of screen: 2 in diameter schedule 40 PVC
   0.010 slot

6- Type screen filter: 10/20 sand to 1 ft above screen.
   1 ft of 100 mesh sand above 10/20 sand.
   a) Quantity used

7- Type of seal: Bentonite (1/4-inch pellets)
   a) Quantity used

8- Grout
   a) Grout mix used: High solids bentonite grout
   b) Method of placement: Tremie
   c) Vol. of surface casing grout
   d) Vol. of well casing grout

Development method: Pumped

Development time

Estimated purge volume

Comments 6-inch filter pack sand placed in bottom of borehole prior to monitoring well installation.

Membrane Interface Probe Investigation OMC Plant 2 (Operable Unit 4), Waukegan, Illinois WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR:	USEPA
PREPARED BY:	CH2M HILL
DATE:	October 13, 2005

Introduction

This memorandum documents the activities associated with the Membrane Interface Probe (MIP) Investigation conducted as part of the remedial investigation at the OMC Plant 2 site in Waukegan, Illinois. MIP activities were performed beneath the existing building, site-wide on the OMC Plant 2 property, and at the Larsen Marine property located south of OMC Plant 2. The MIP investigation commenced on January 11, 2005, and was completed on March 9, 2005.

The objectives of the MIP investigation were to:

- Collect soil conductivity data and depth to the top of the till
- Define the relative nature and horizontal and vertical extents of volatile organic compounds (VOCs) in soils and groundwater
- Determine the locations of groundwater monitoring wells
- Collect soil and groundwater grab samples to correlate MIP readings to quantitative analytical VOC concentrations

This memorandum summarizes the following:

- Description of field activities performed, including locations, methods, and deviations from the site-specific project plans
- A summary of sample locations, depths, and observations
- MIP logs have been included as Attachment 1

Field Activities

The MIP investigation and the confirmatory soil and groundwater grab sampling were conducted by Innovative Probing Solutions of Mt. Vernon, Illinois. The MIP investigation and sampling procedures and observations are discussed in the following sections.

MIP Investigation

Locations

The initial MIP locations in Plant 2 proposed in the FSP were based on a 200-foot grid with tighter, focused probe locations completed on a 100-foot grid spacing within areas of known or suspected contamination. These initial MIP locations were based on concentrations of trichloroethylene (TCE) previously detected in groundwater samples and the till elevations reported during previous investigation activities at OMC Plant 2. Analytical results from previous investigations also indicated elevated TCE concentrations (greater than 10 µg/L) in areas outside the building near the northwestern portions of the site and areas just south and west of the Corporate Building.

The actual MIP locations were adjusted based on the interpretation of the results in the field and the preliminary analytical results. A total of 95 MIPs were conducted at the OMC Plant 2 site and south of the site on the Larsen Marine property. The locations of the MIP borings are shown in Figure 1. Based on the results from boring MIP-077, MIP-078 was not performed.

Investigation Procedures

The MIP probe was mounted in a van and advanced with a Geoprobe® direct-push unit. The MIP probe was connected to three detectors, including a flame ionization detector (FID), a photo ionization detector (PID), and an electron capture device (ECD) by a trunk line. In addition, the MIP probe contained a conductivity sensor. At each location, the MIP was set up and tested before the start of probing. MIP operational testing included using butane gas to determine gas travel time from the probe to the detectors. The gas travel time was then input to the computer to allow FID, PID, and ECD readings to be correlated with depth by the computer. In addition, the butane gas served as a response test for the FID sensor. Response testing of the ECD and PID was also conducted to confirm accurate detector response. Response testing of the ECD and PID sensors was performed by IPS using a TCE standard.

After confirming operation of the MIP sensors, the MIP probe was placed at ground surface, the depth reading was zeroed, and the probe location was input to the computer. For locations inside the building, the concrete floor was cored before probe advancement and the ground surface elevation was zeroed to the base of the cored concrete. The probe was then allowed to warm to 121°C before advancement. The probe was advanced in 1.5-foot discreet intervals. After each 1.5-foot probe advancement, FID, PID, and ECD readings were allowed to stabilize and the probe temperature was allowed to recover. Advancement of the probe in 1.5-foot intervals continued until refusal was encountered, generally at the till surface.

If refusal was encountered at a depth above the anticipated till depth, the probe was removed and decontaminated, and the boring was abandoned. A new probe location was attempted at an offset of 6 feet. Offset probe locations were given the same location ID; however, consecutive letters were added to identify the locations as offsets (e.g., MIP-001a, MIP-001b, etc). Offset locations were noted in the field notebook.

The MIP logs presenting the FID, PID, and ECD readings with depth for each location are included in Attachment 1.

Decontamination

After the probe location was completed, the probe and rods were removed from the borehole. As each rod was removed, it passed through a rod-wiper to remove any excess soil. Each rod was then placed in a rod holder until all rods were removed. The rods, rod rack, trunk line, and probe were decontaminated by spraying them with a solution of Liqui-Nox® and water, and scrubbing with a nylon brush. All equipment was then rinsed with potable water. The decontamination water was collected and placed into a poly tank for storage and disposal.

Deviations from Proposed Procedures

As probing commenced, it became apparent that the process for probe temperature recovery would need to be modified. With air temperatures below freezing, depth to groundwater less than 4 feet, and groundwater temperatures at or below 50 degrees, allowing the probe to recover to 121°C before advancement could not be accomplished. In most cases, the sensor readings stabilized in less than 2 minutes, while it took nearly 10 minutes for the temperature of the probe to recover to 90°C. In order to allow work to continue and ensure data integrity, the procedure was modified to allow the probing to continue when detector readings had stabilized and the probe temperature had reached at least 90°C.

At few locations the probe did not reach 90°C because of extreme cold weather conditions. At these locations, the probe temperature was allowed to recover for an additional 10 minutes after detector readings were stable before advancement was resumed.

The MIP probe often required repairs during completion of a probe location. In these cases, the probe was removed from the boring, decontaminated, and repaired, and probing resumed in the same borehole. Because of MIP software limitations, the rerun of the same borehole was assigned the same location ID with a consecutive letter added to identify the probe as a rerun of the same borehole (e.g., MIP-001a, MIP-001b). The rerun was then noted in the log book. This naming convention was also used to designate a boring offset location. Field notes were referenced to differentiate the offset boring locations from rerun boring locations.

Approximately 65 MIP locations beneath the existing building were planned with an additional 25 borings available for delineation. The MIP investigation beneath the existing building was completed with 45 MIP locations. An additional 50 MIP locations were performed outside the existing building. The number of MIP locations was modified because MIP logs indicated less extensive soil and groundwater contamination beneath the building than anticipated. MIP locations outside of the building were added to delineate contamination indicated by MIP logs performed during initial MIP investigation activities.

Soil and Groundwater MIP Confirmation Sampling

A total of 95 MIP locations were completed as part of the OMC Plant 2 investigation. The data recorded by the MIP sensors is a relative response reading. The MIP sensors do not report quantitative VOC concentrations. To correlate MIP sensor response to VOC concentrations, soil and groundwater samples were collected from 10 percent of the MIP locations.

Locations

The locations for the soil and groundwater grab samples for confirmation of the MIPs' response are identified in Figure 1. The locations were selected such that the samples would be collected from locations exhibiting a range of sensor responses. The results of this effort will be used to develop a response versus concentration curve for the investigation.

Sampling Procedures

Soil samples were collected from above the water table using a Geoprobe® direct push unit and were analyzed for VOCs. Soil samples were collected in accordance with *FOP-03 Direct Push Soil Sample Collection*. Groundwater grab samples were collected from three discreet depths at each MIP location. Depths of groundwater grab samples were selected based on MIP detector response logs.

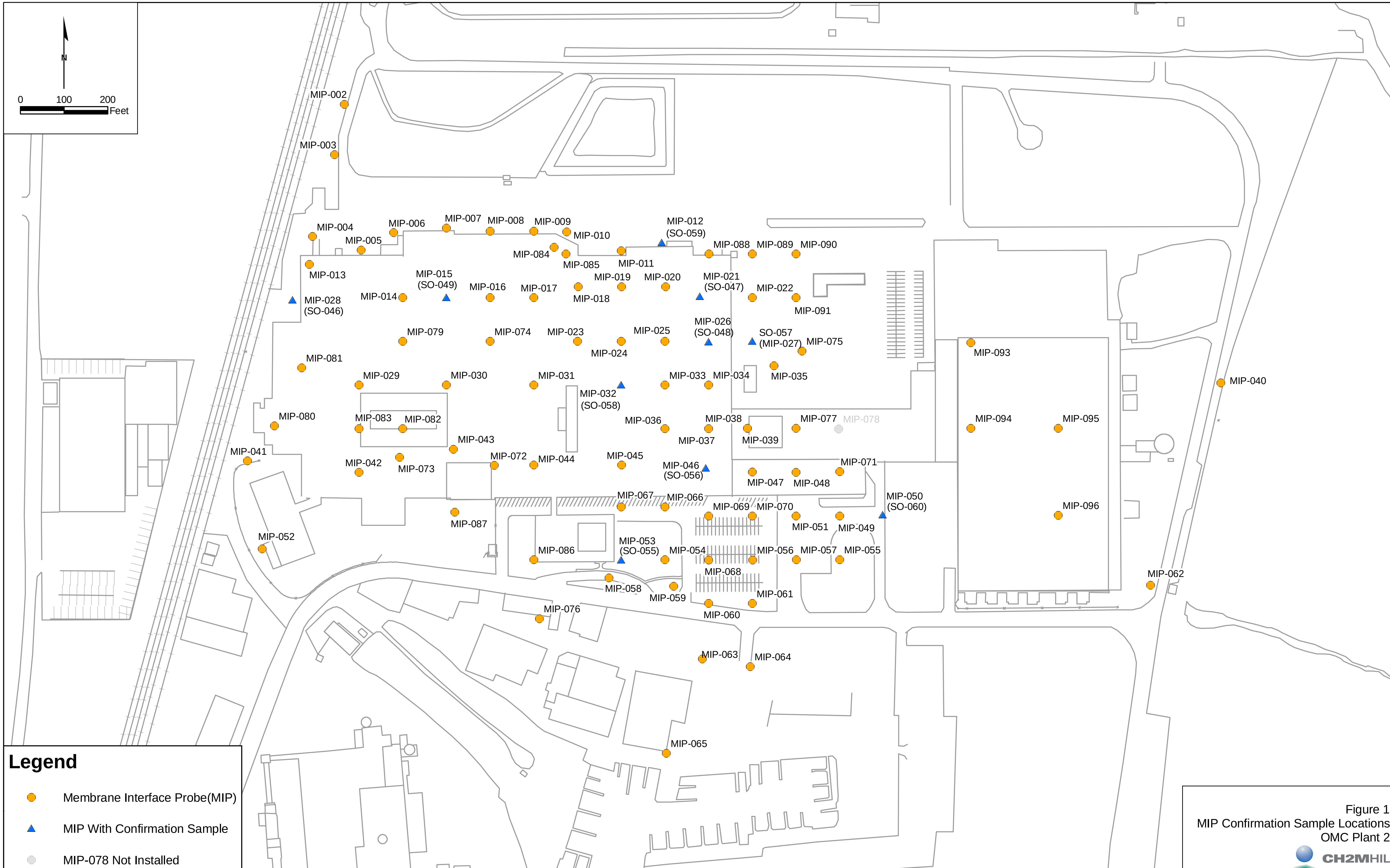
Groundwater grab samples were collected using a Geoprobe® direct push unit equipped with a discreet screen-point sampler with a 3-foot screened interval. The screen point was advanced to the target depth and the screen was opened. Prior to sample collection, approximately 1 gallon of water was purged from the interval using disposable Teflon® tubing equipped with a check valve. After 1 gallon of water had been purged, the groundwater sample was collected by filling three, 40-mL glass vials preserved with hydrochloric acid. All equipment and tooling used for soil sampling and groundwater grab sampling was decontaminated between samples in accordance with *FOP-17 Rig and Equipment Decontamination*. All groundwater was purged into a 5-gallon bucket and transferred to a poly tank onsite.

Deviations

Based on MIP sensor response, NAPL was encountered at the base of MIP-027. A groundwater grab sample was collected at MIP-027. NAPL samples were to be collected using a Teflon® or stainless steel bailer or a peristaltic pump with Teflon® tubing. Because the nonaqueous-phase liquid was denser than water and at a depth greater than 25 feet, it could not be recovered with a peristaltic pump. The diameter of the discreet sampling tool was not large enough to allow collection with a bailer. NAPL collection was accomplished using Teflon® tubing equipped with a check valve at the bottom end of the tubing.

Reference

CH2M HILL. 2004. *Field Sampling Plan, OMC Plant 2, Waukegan, Illinois, Final*. November.



Legend

- Membrane Interface Probe(MIP)
- MIP With Confirmation Sample
- MIP-078 Not Installed

Figure 1
MIP Confirmation Sample Locations
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\July05\Fig1_MIP_Confirmation_Locations.mxd, Date: 08 01, 2005 3:15:39 PM, User: JHANSEN1

Attachment 1

MIP Boring Logs
OMC Plant 2 (Operable Unit 4)

MIP LOGS
PRODUCED IN
THE FIELD

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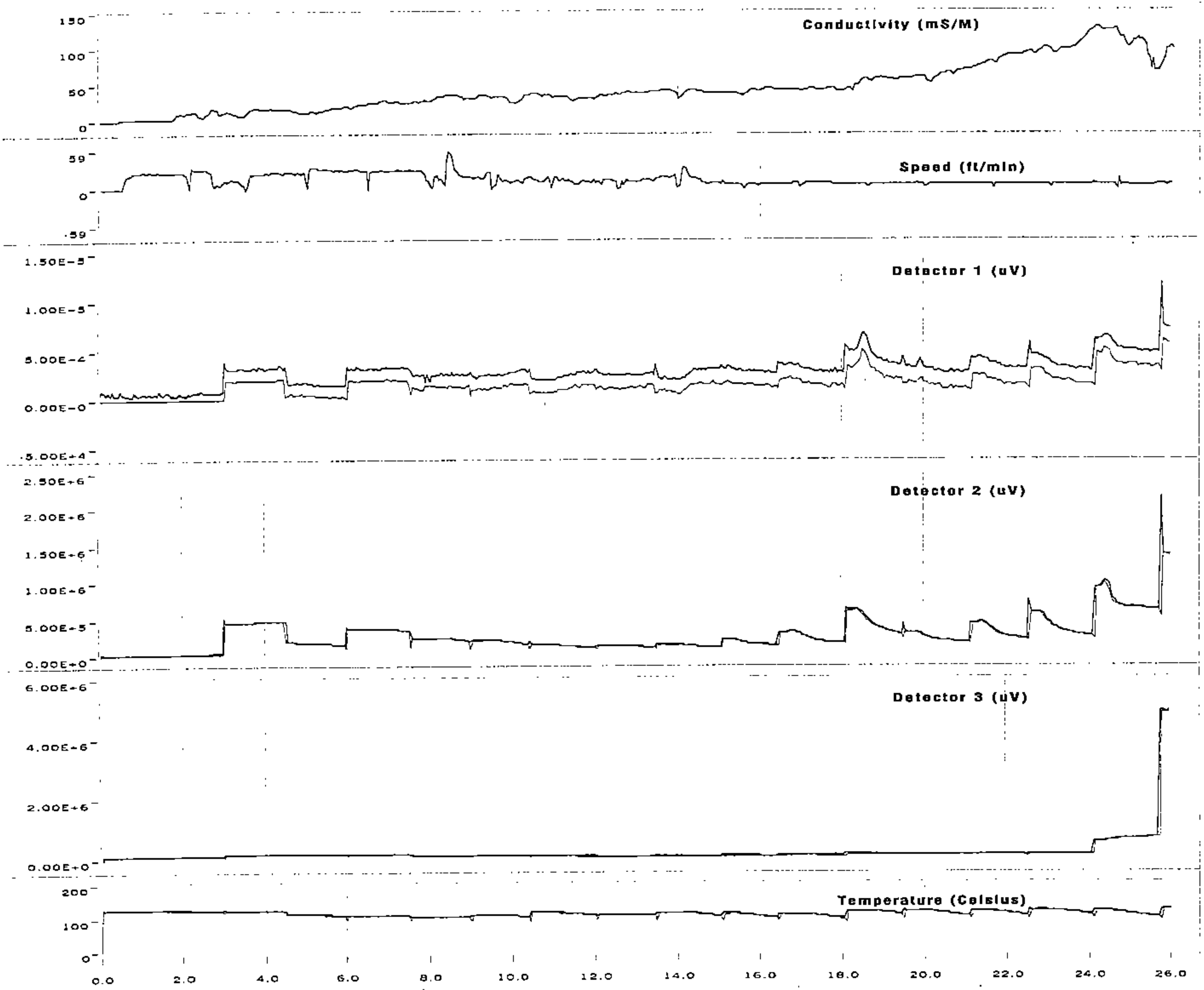

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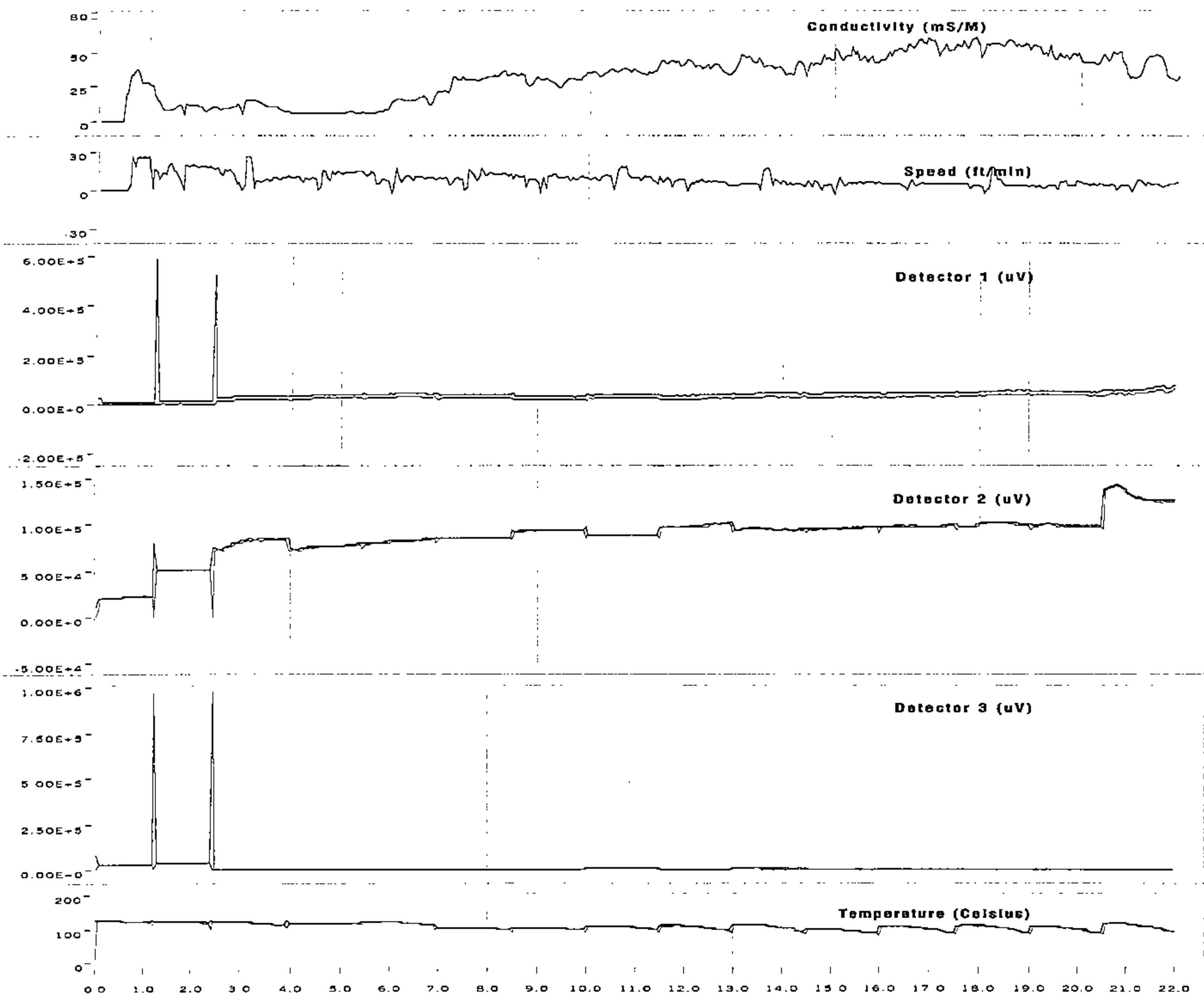

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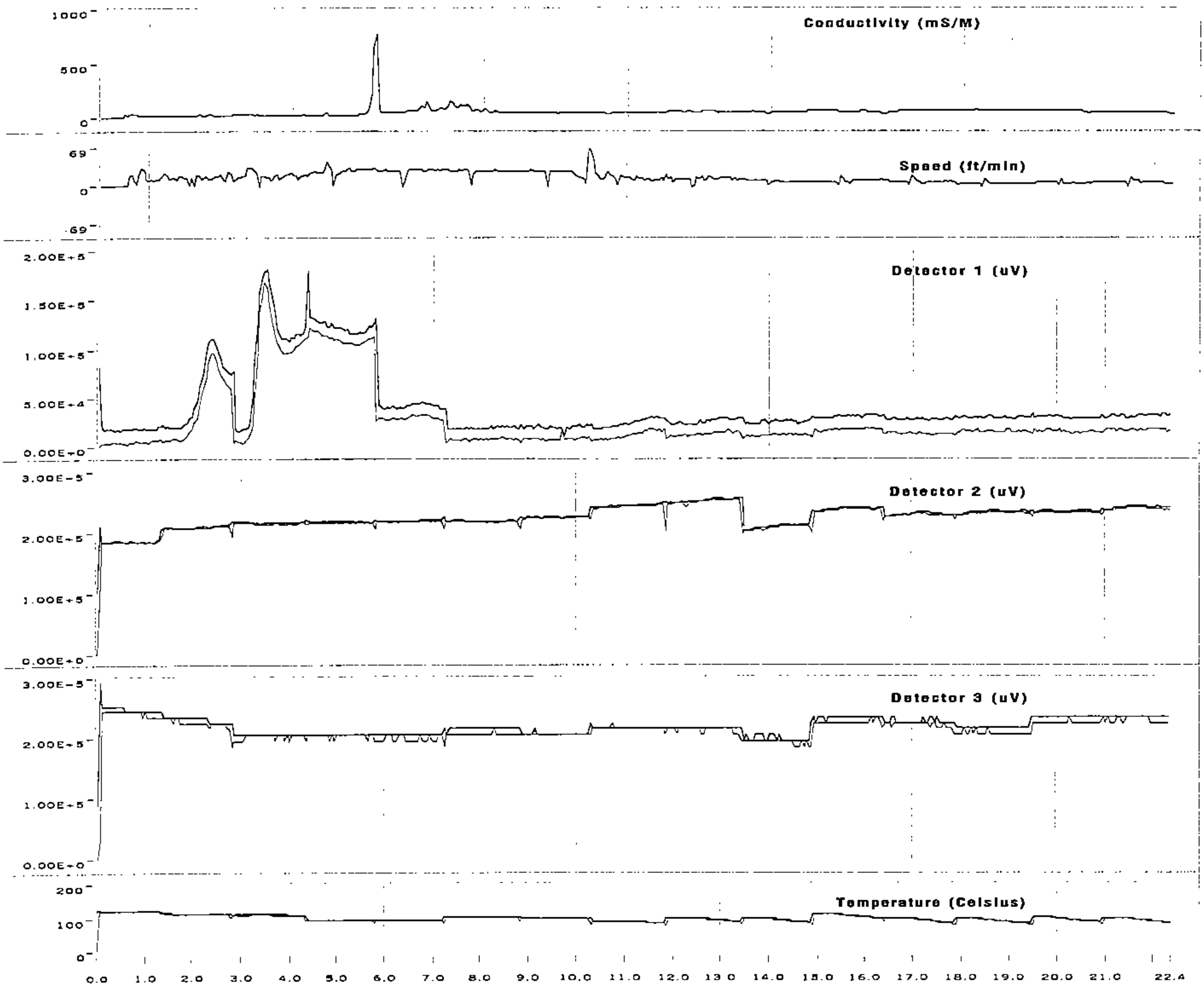

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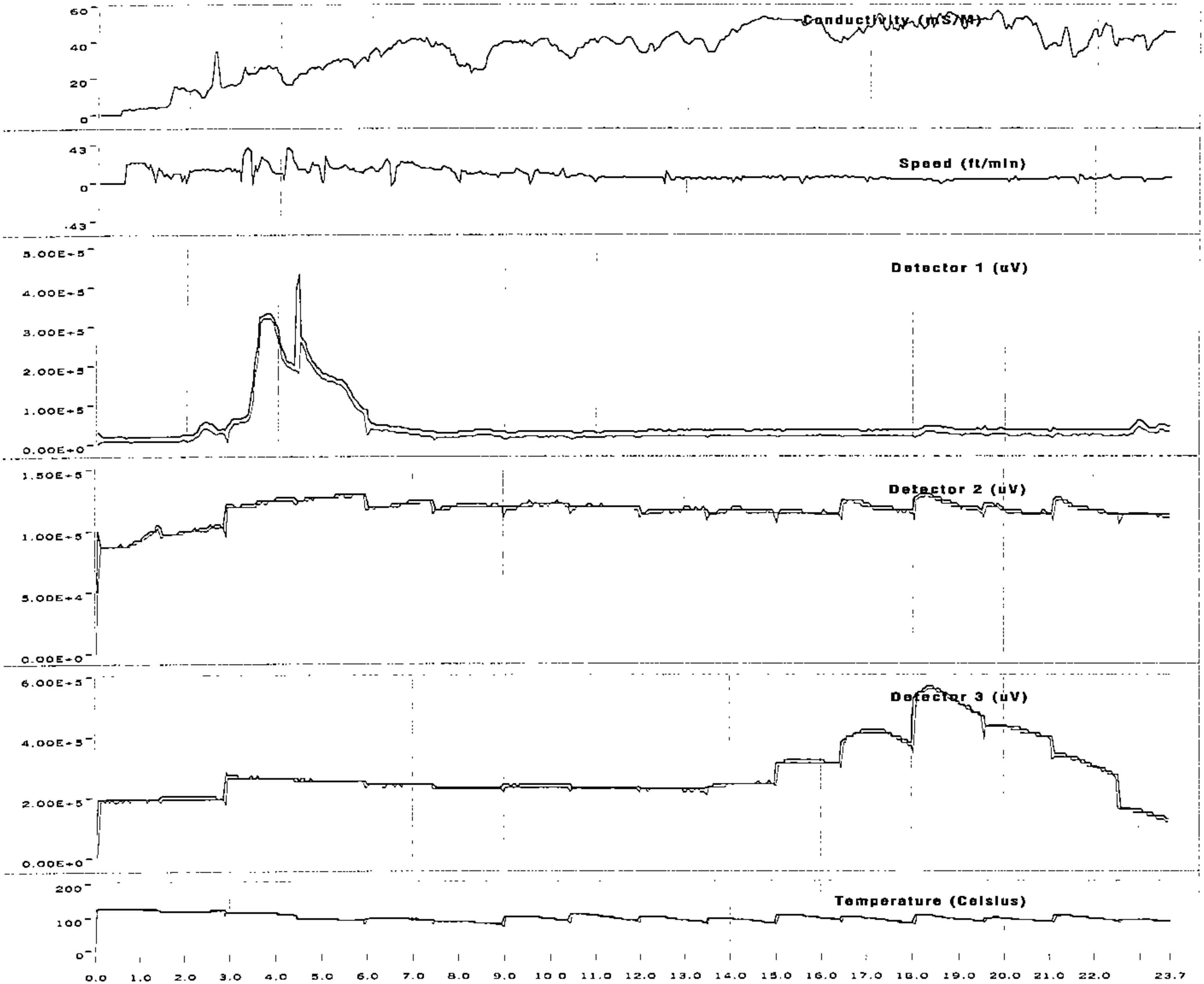

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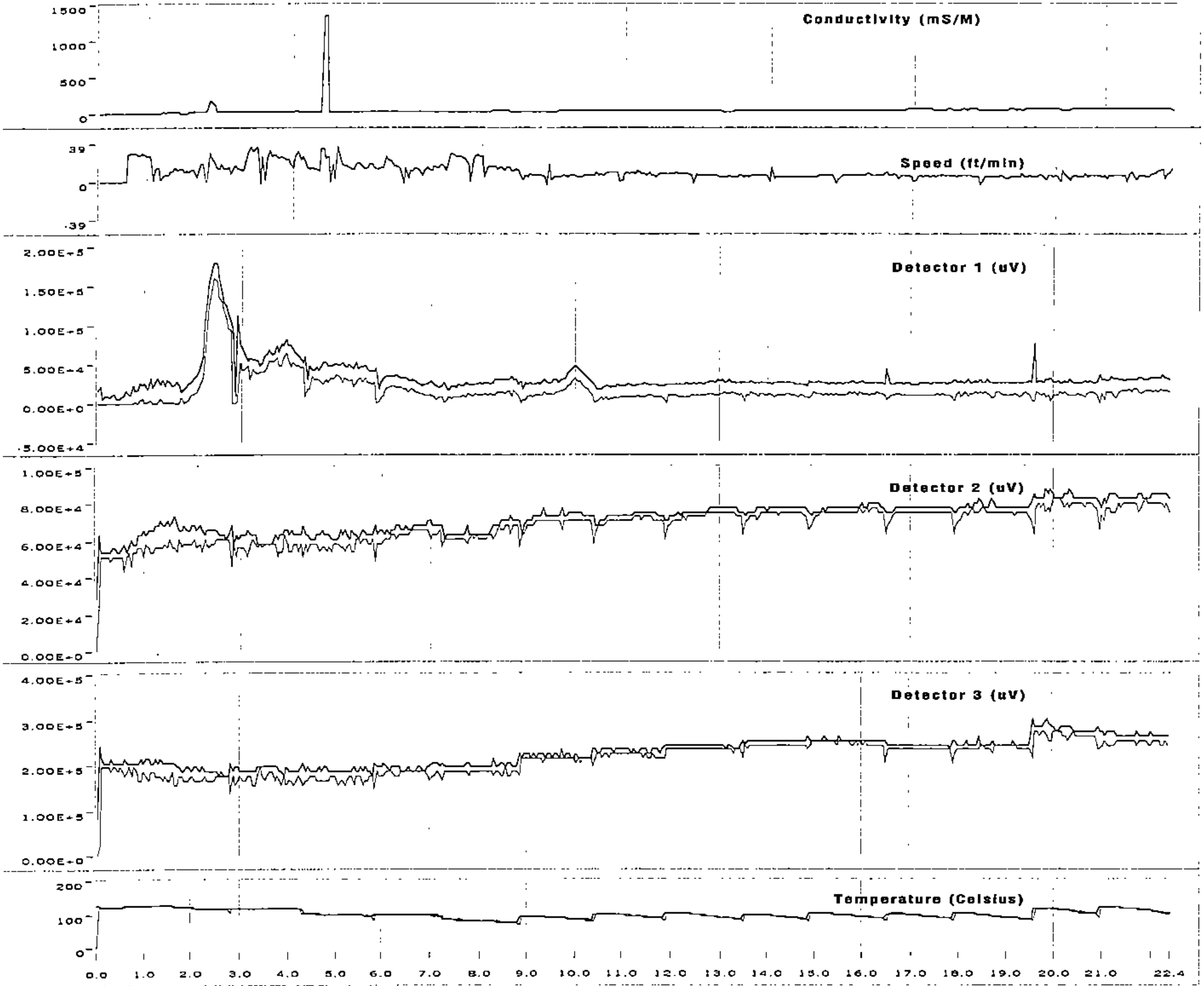

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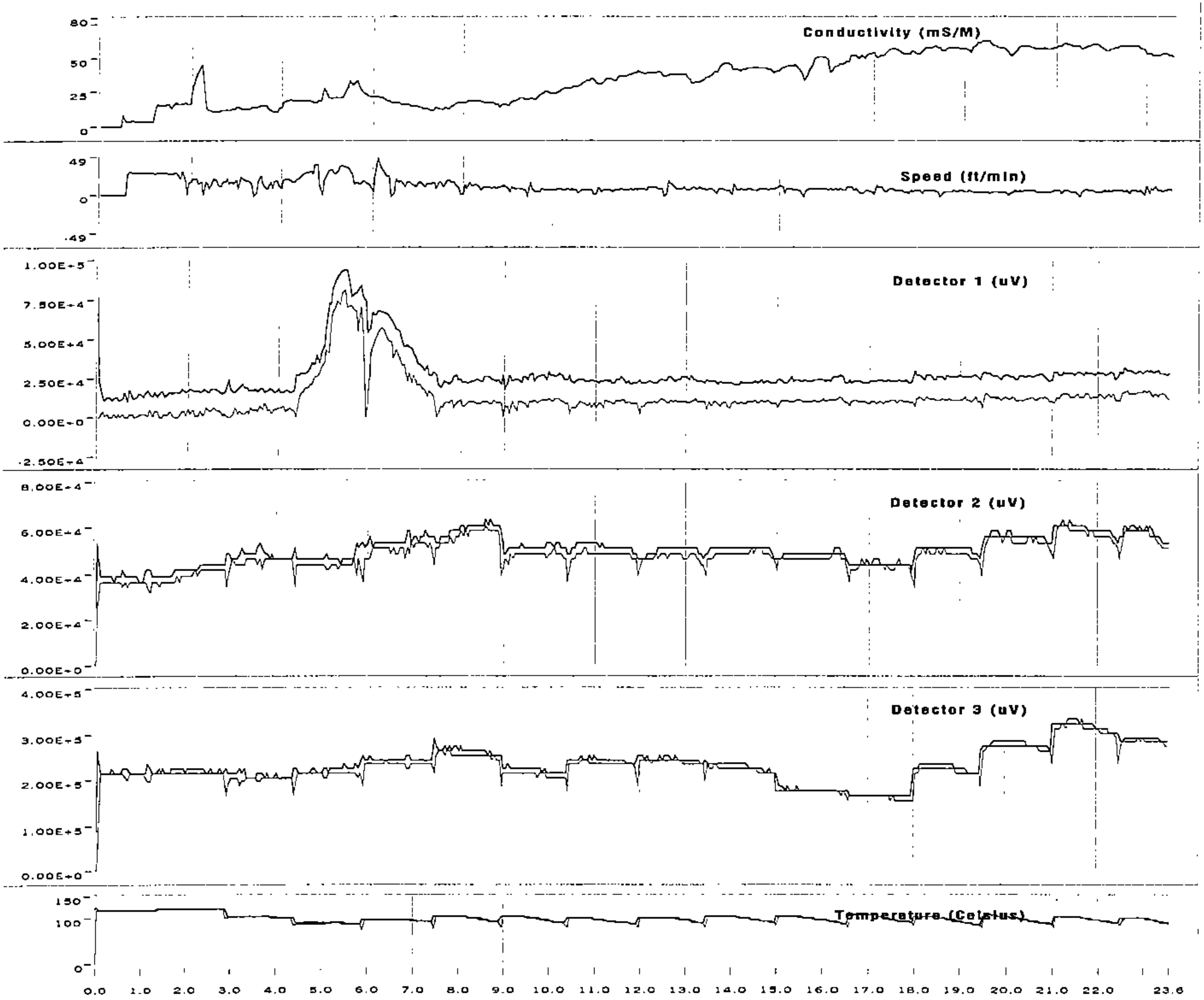

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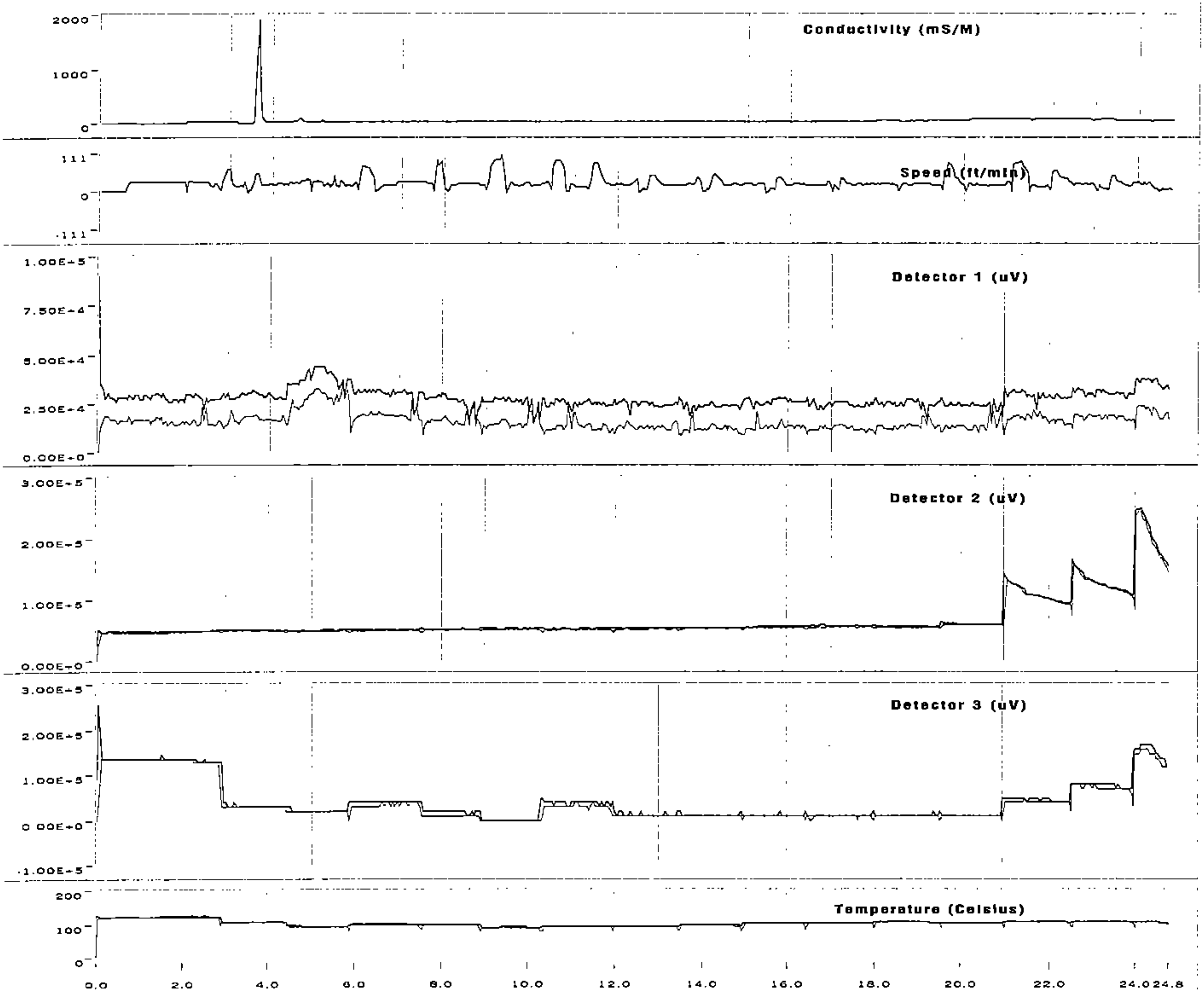

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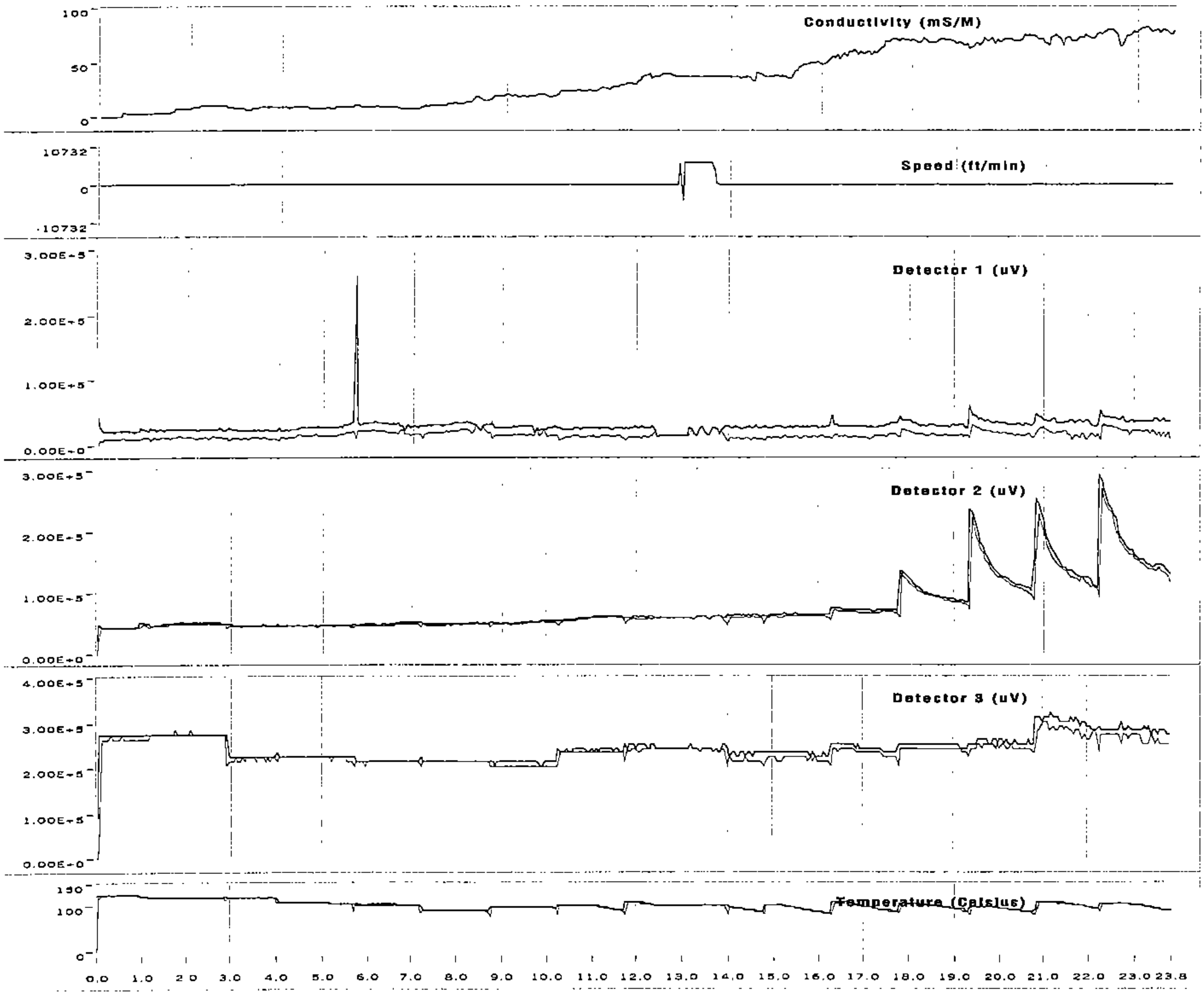

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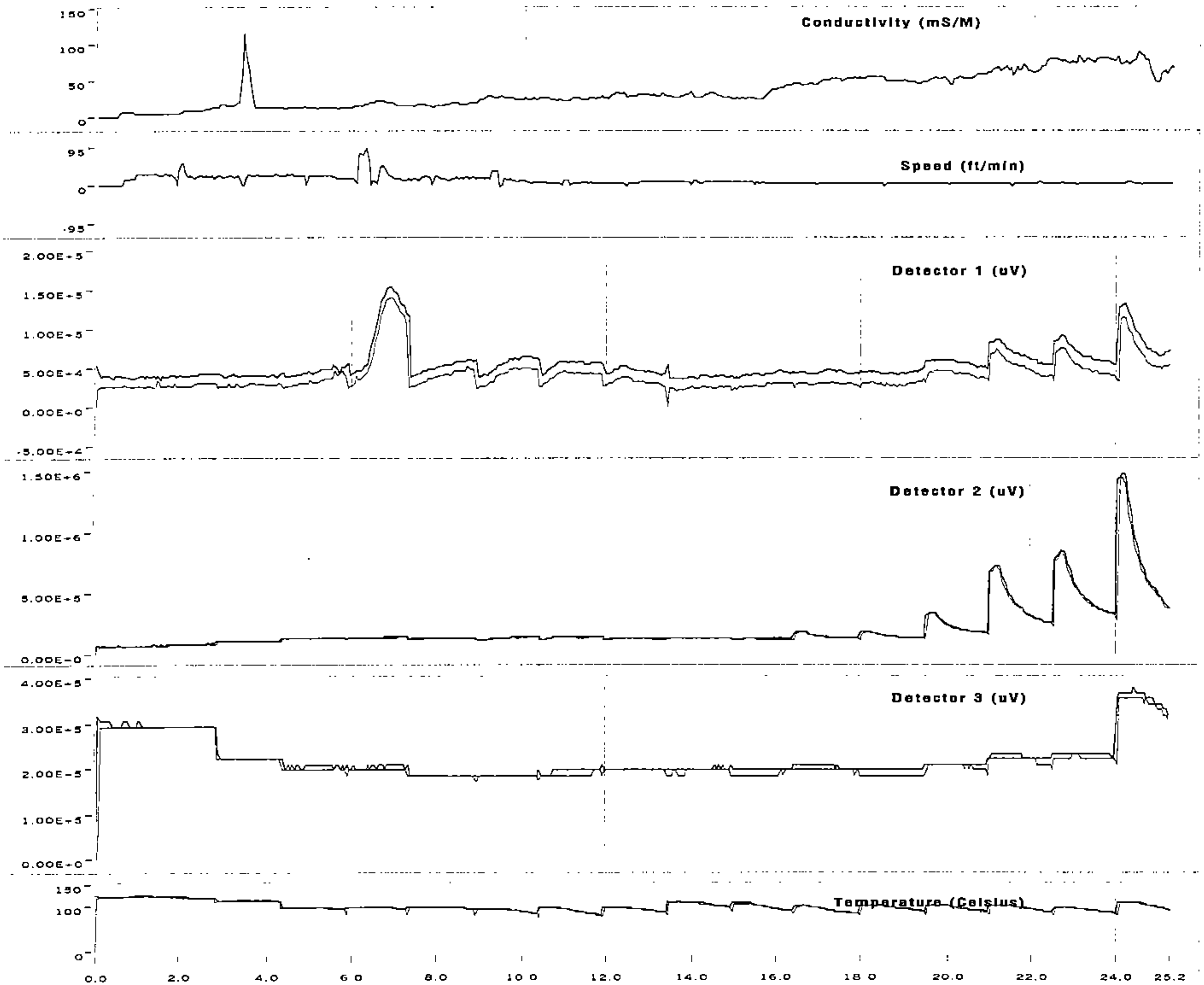

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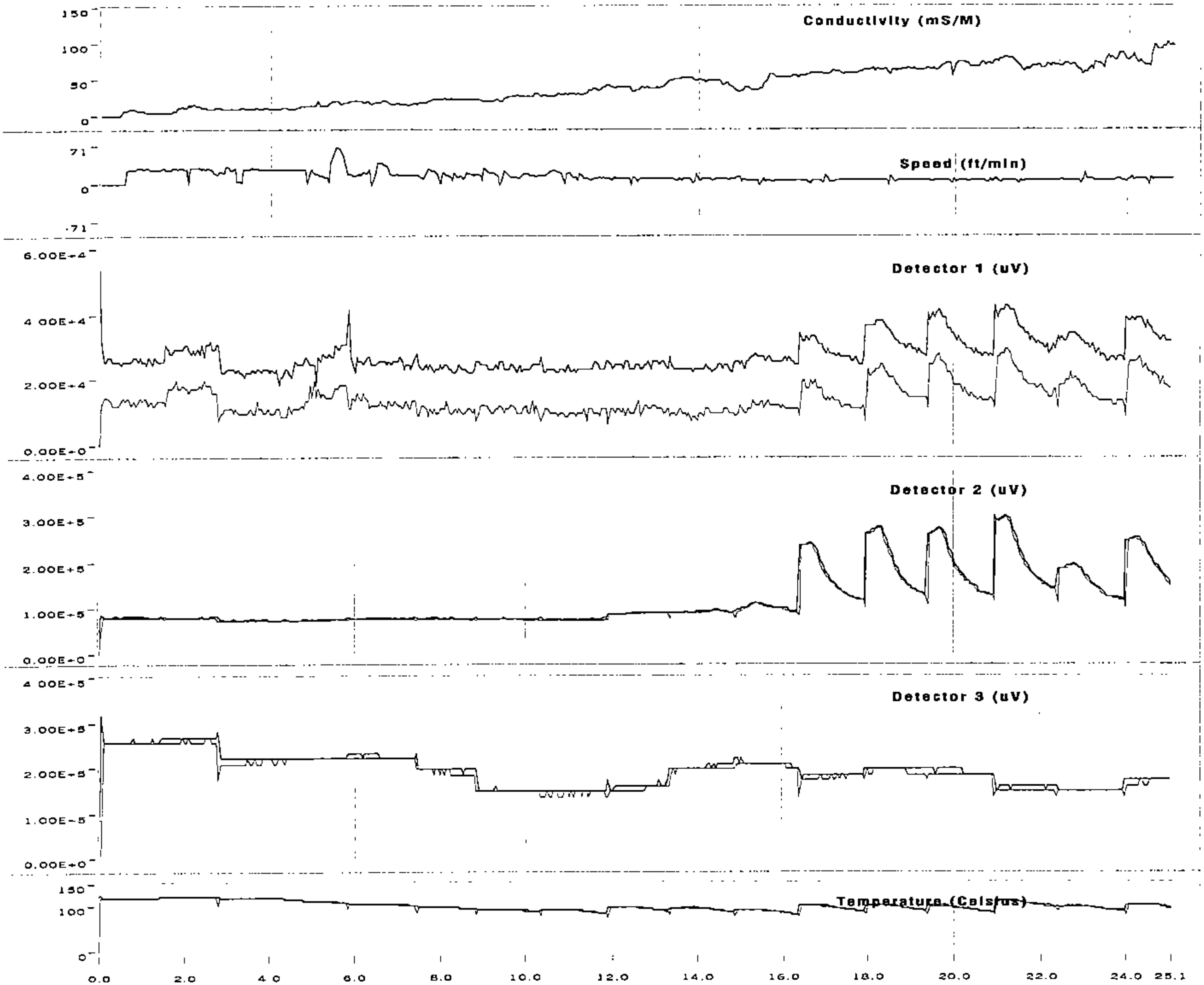

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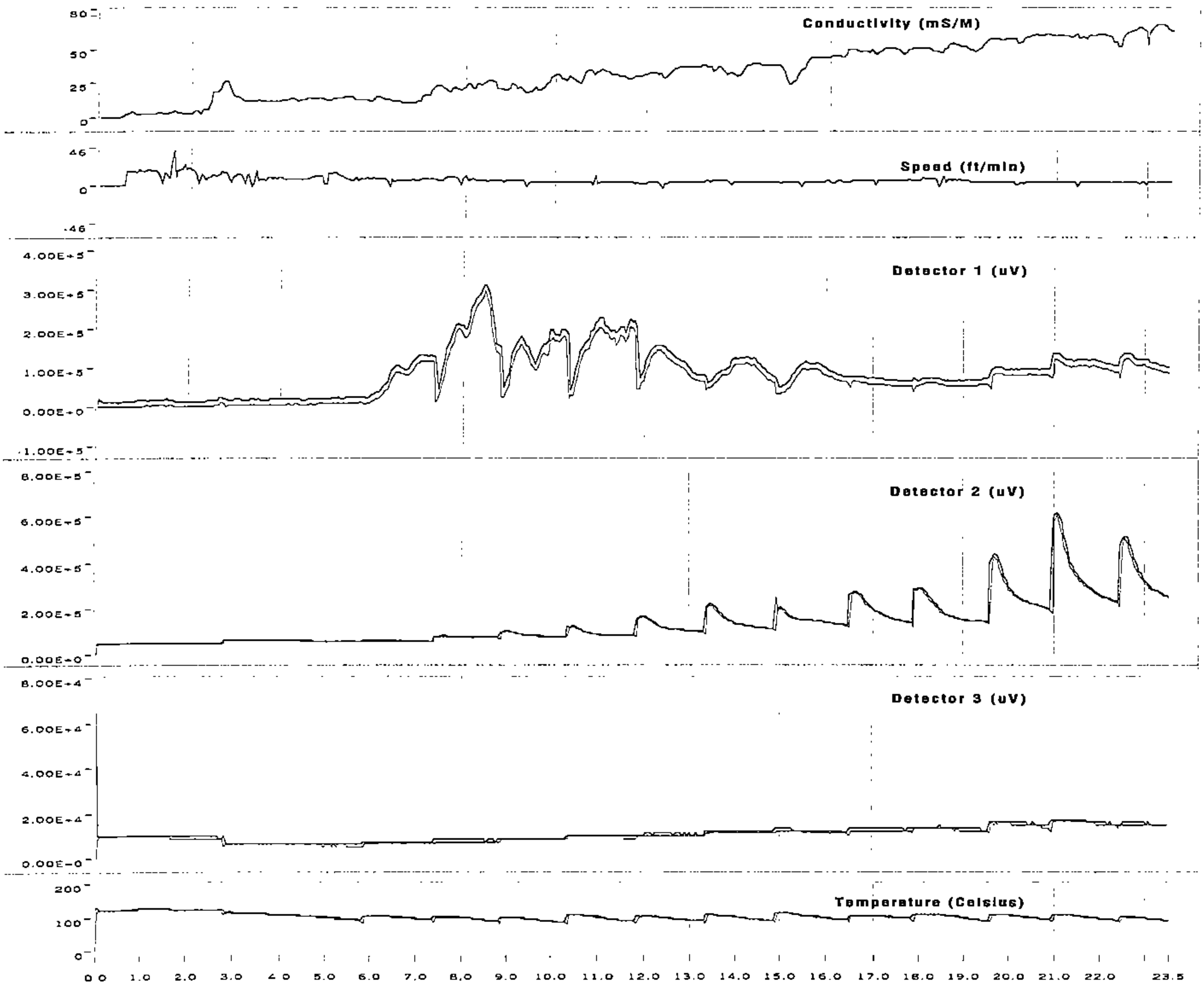

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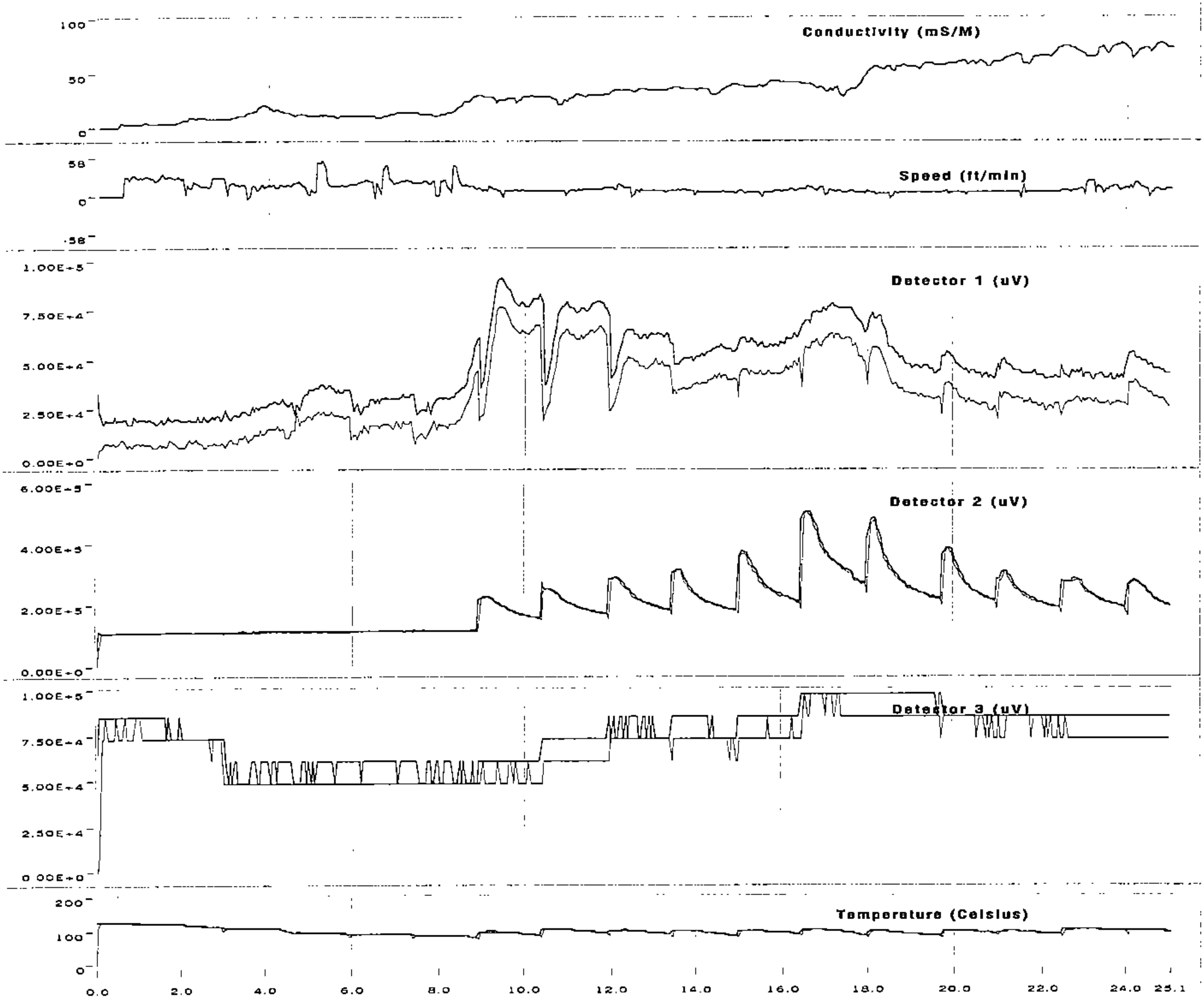

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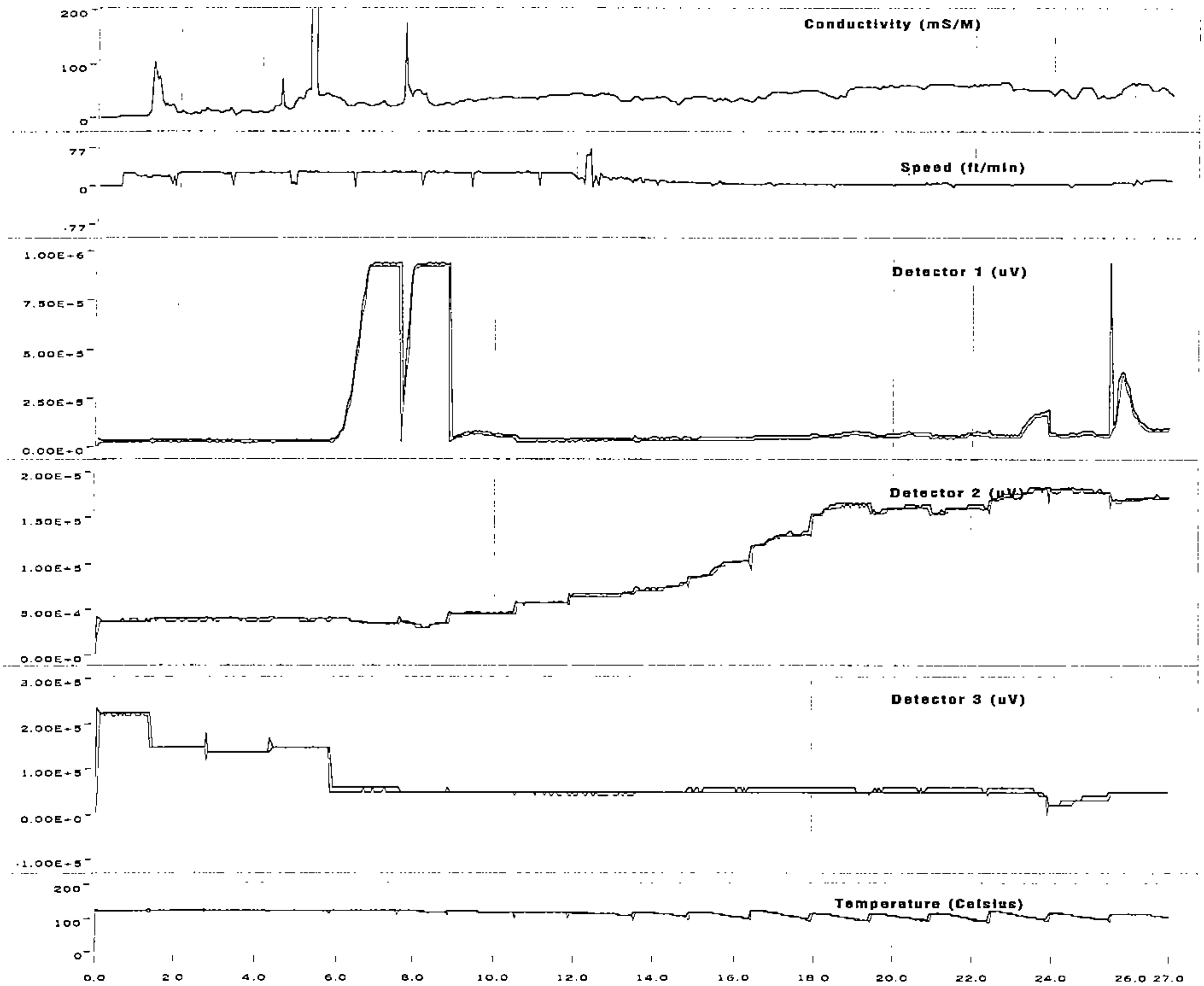

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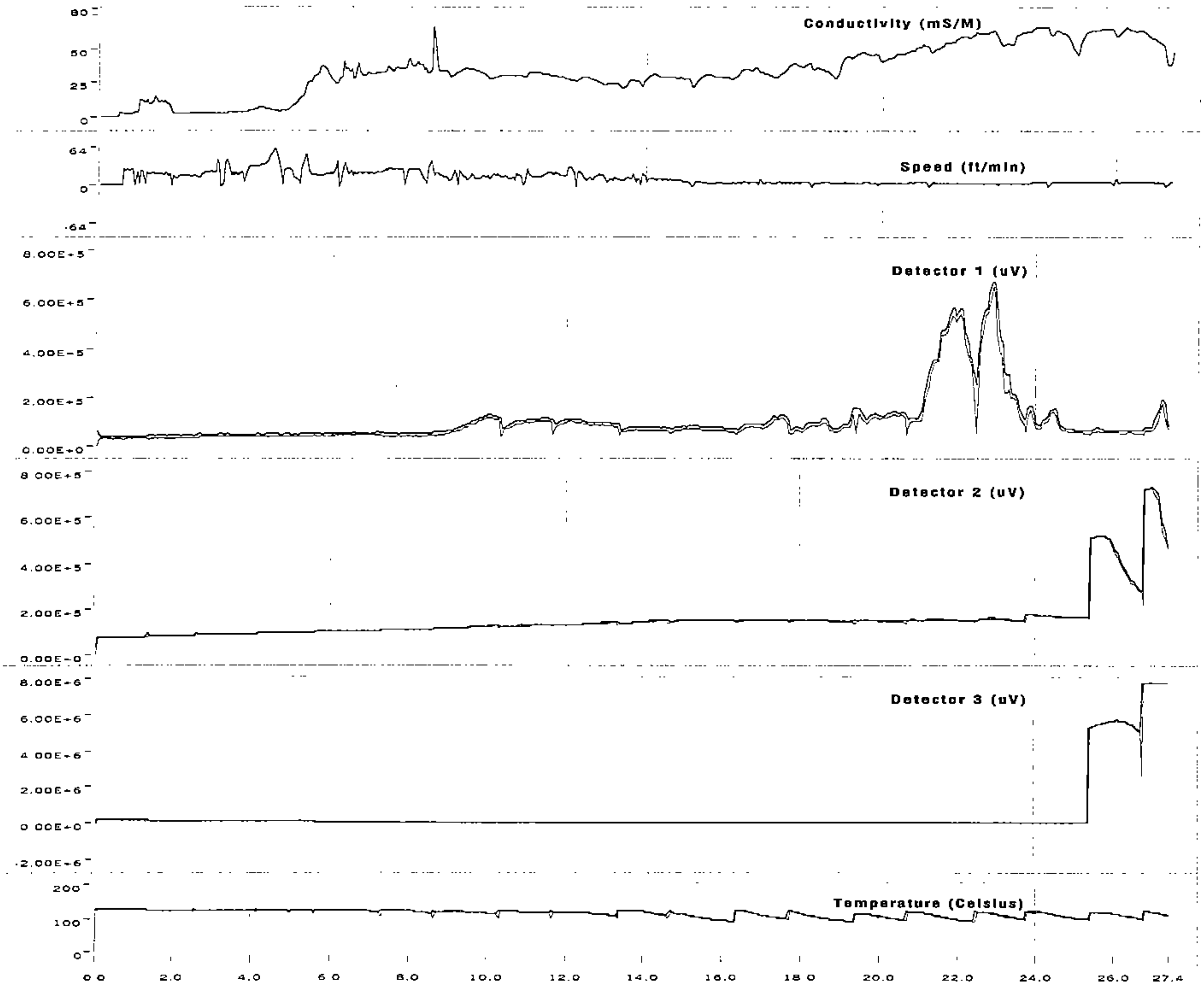

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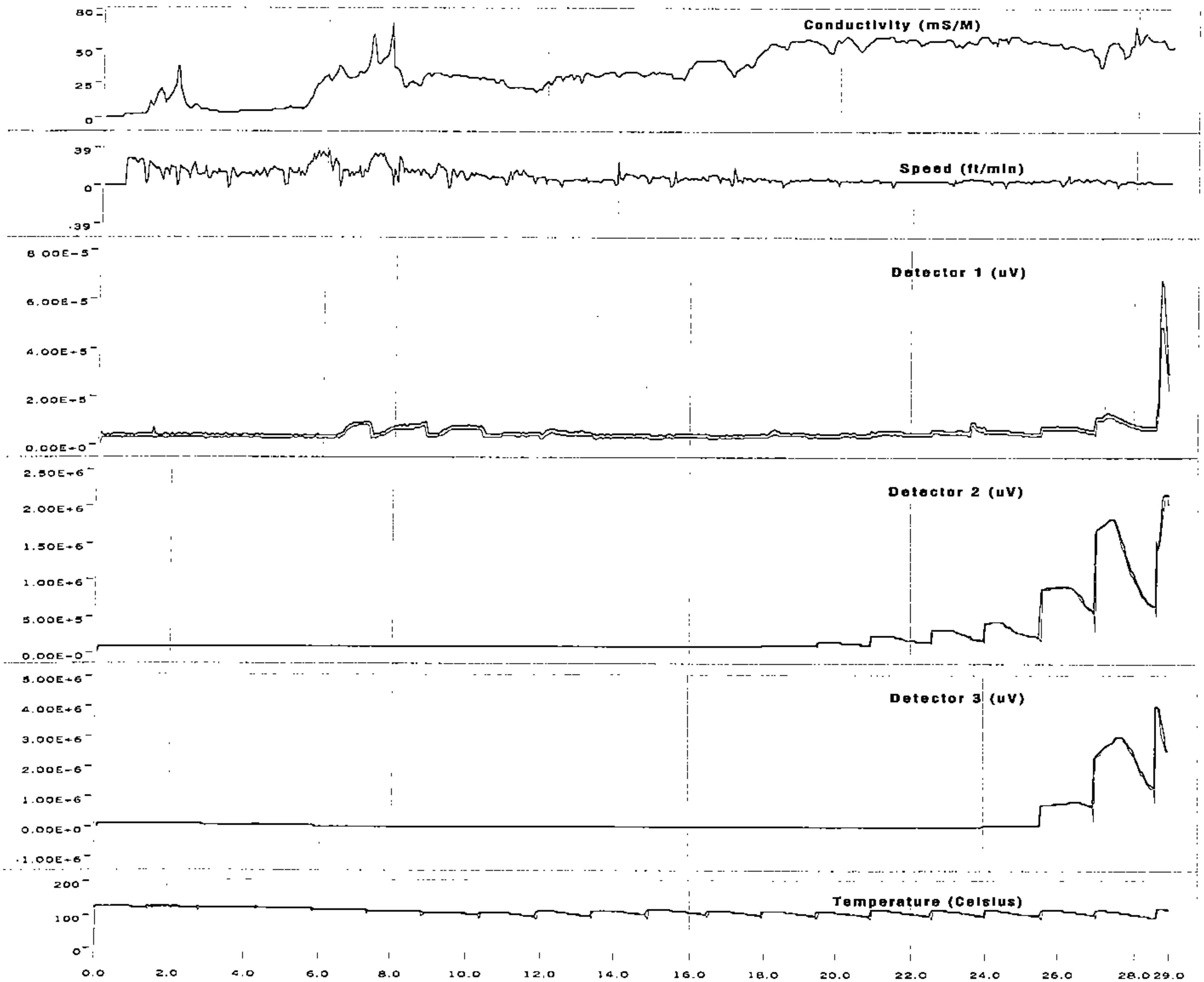

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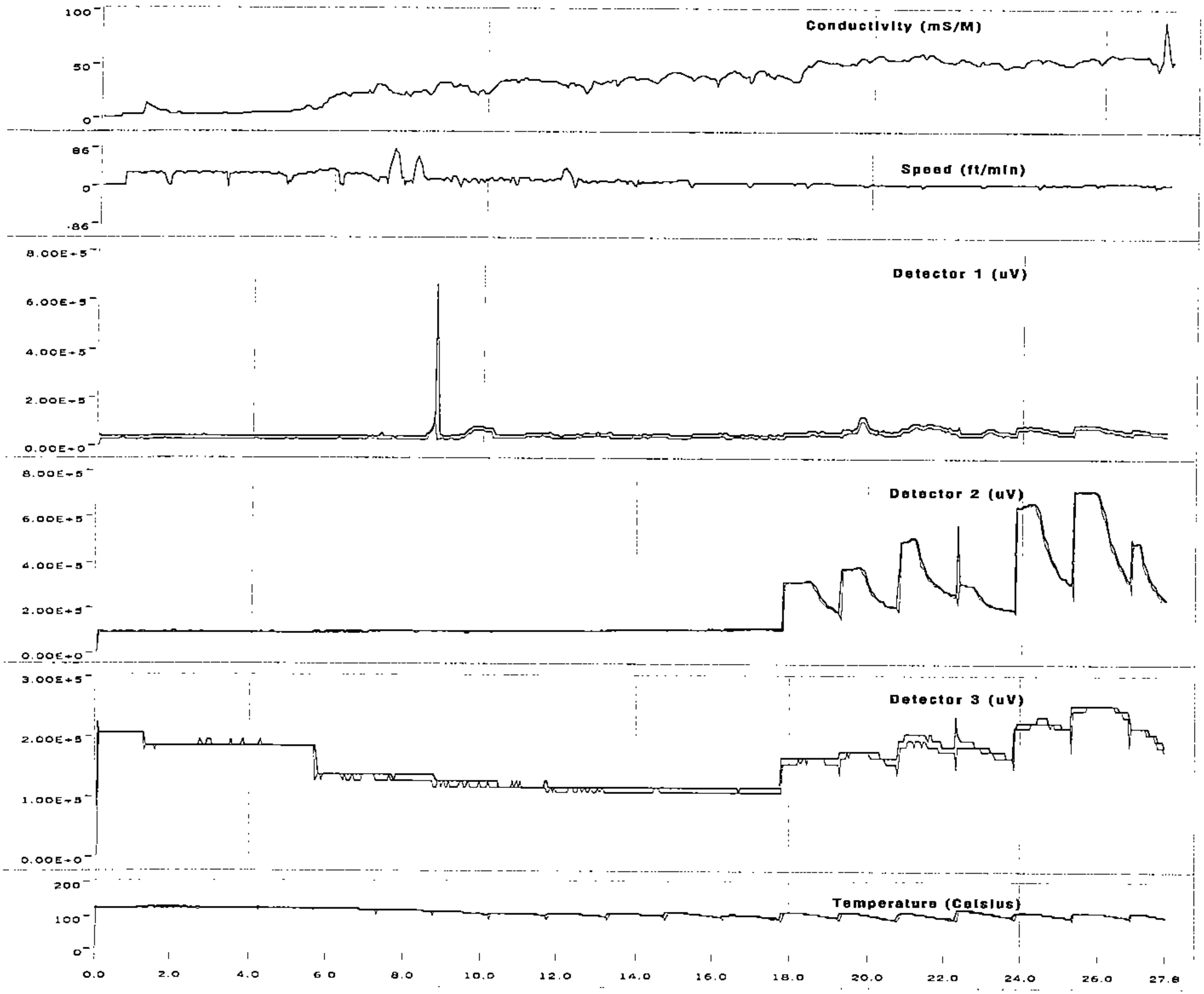

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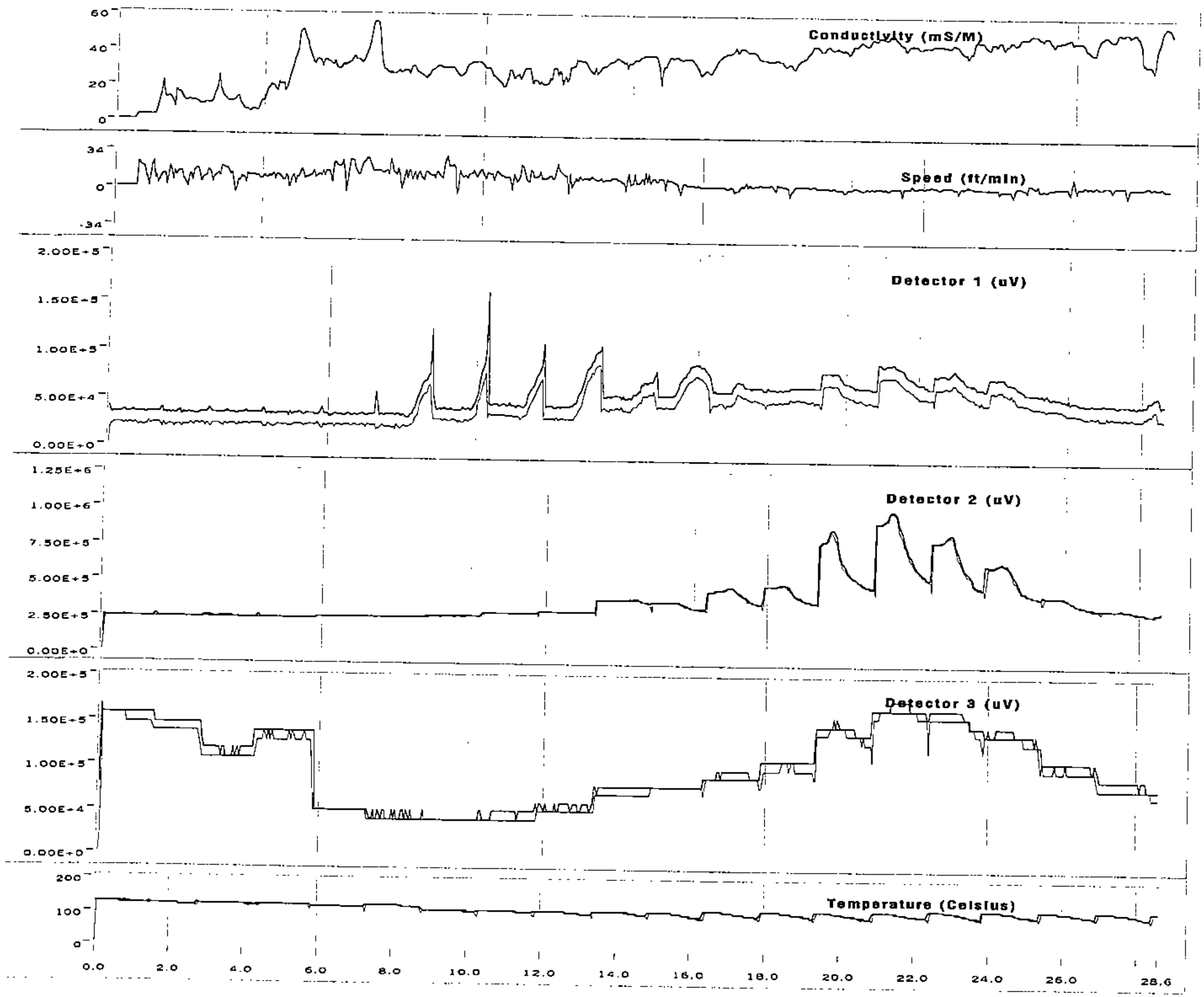

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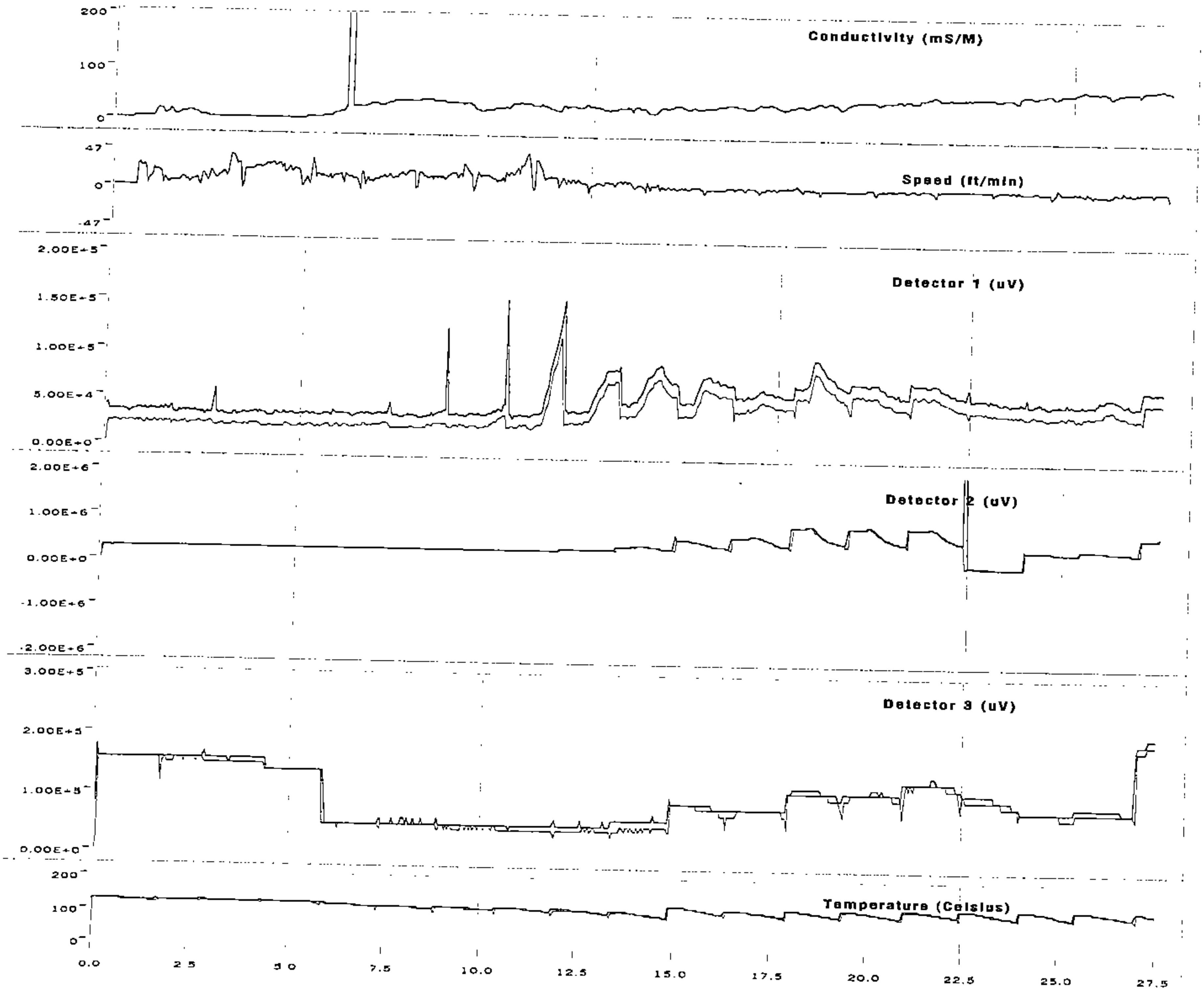

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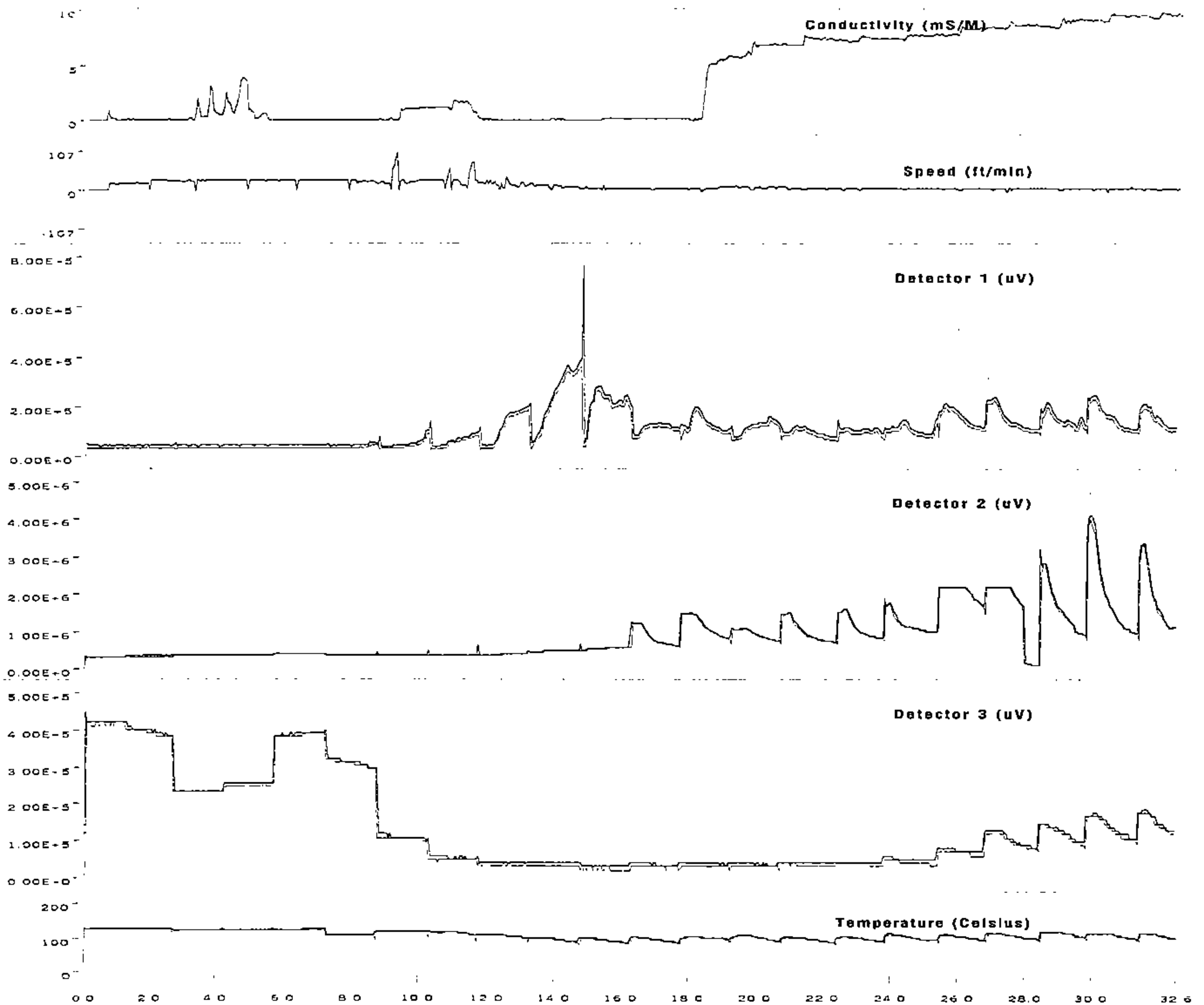

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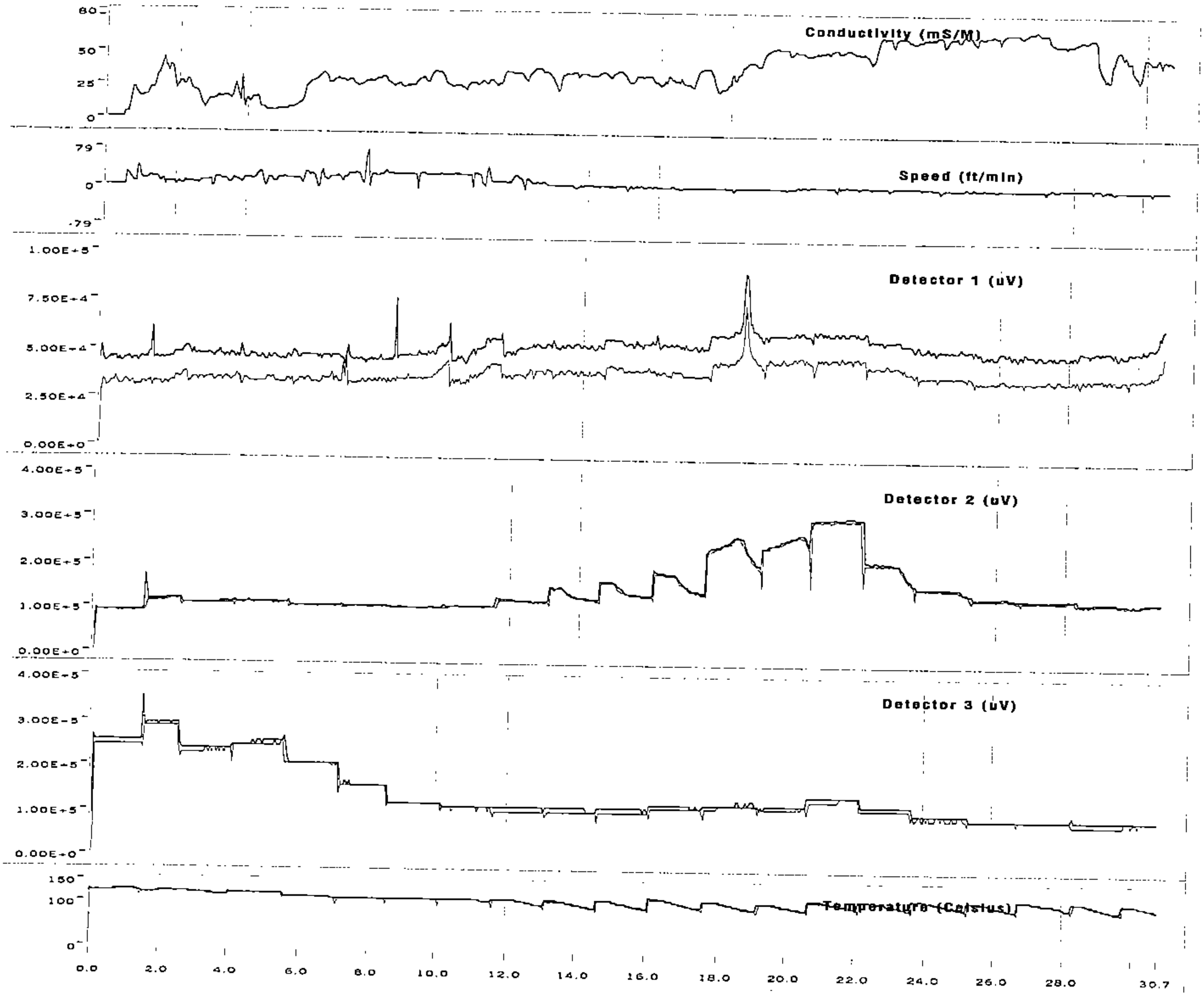

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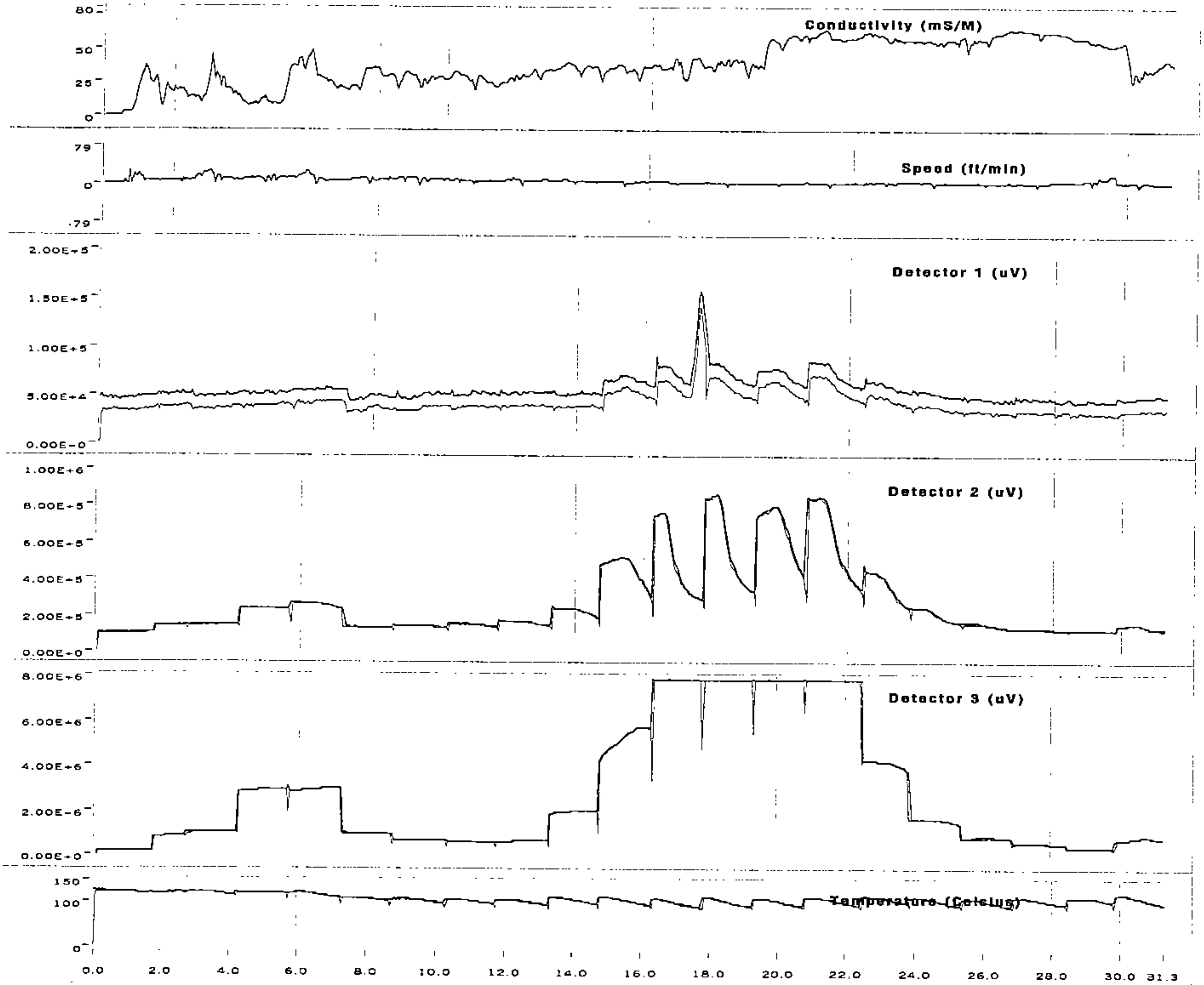

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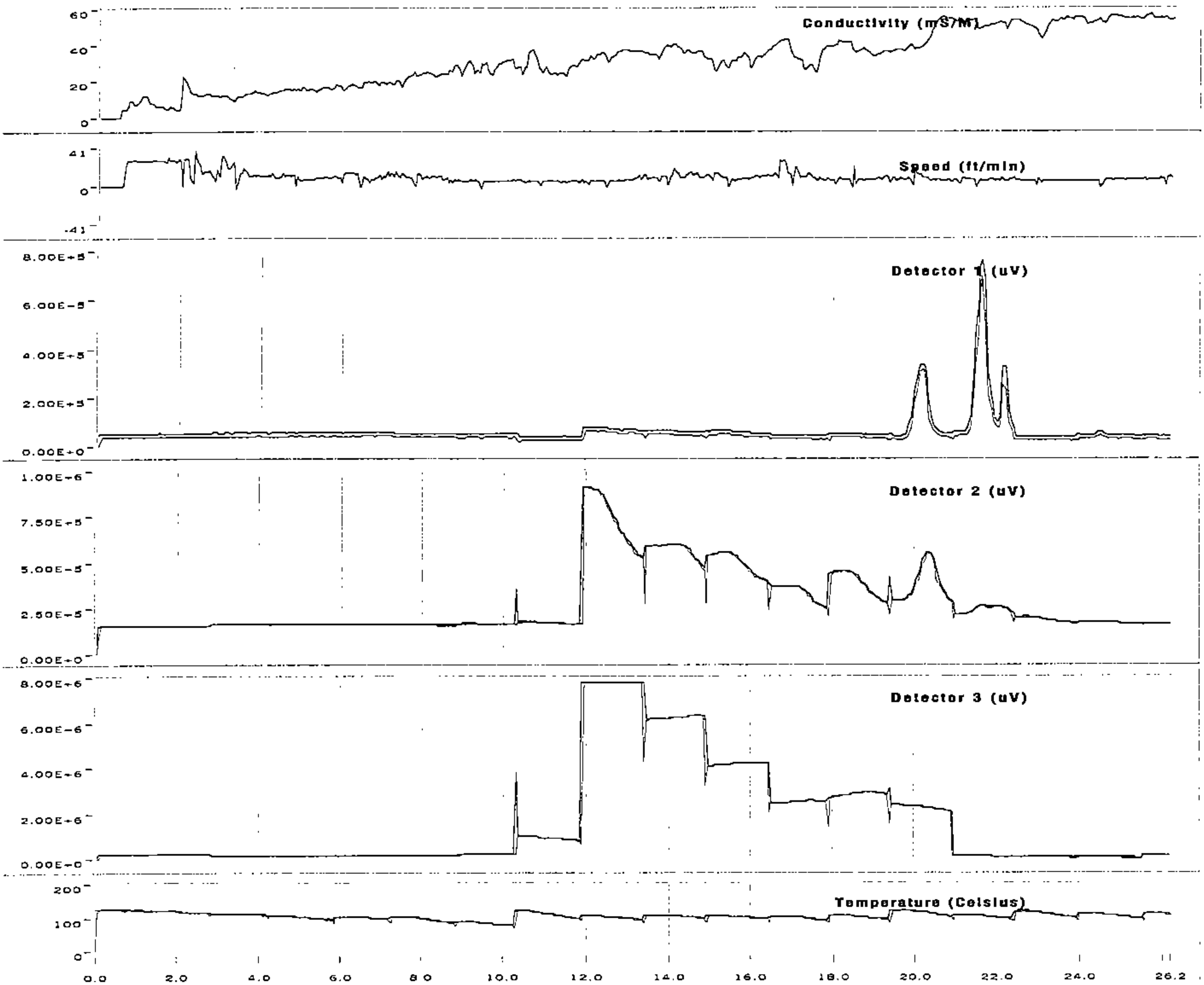

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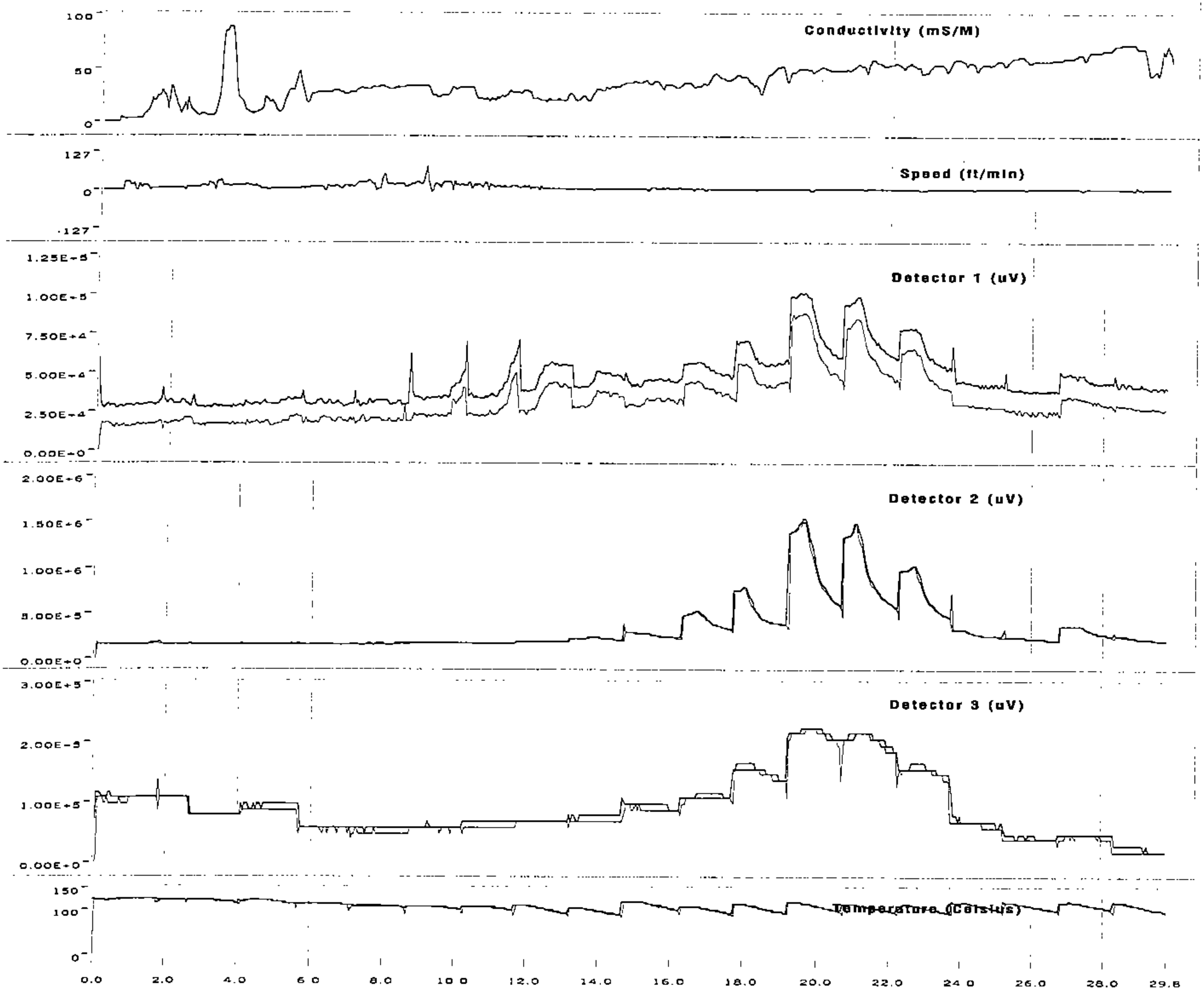

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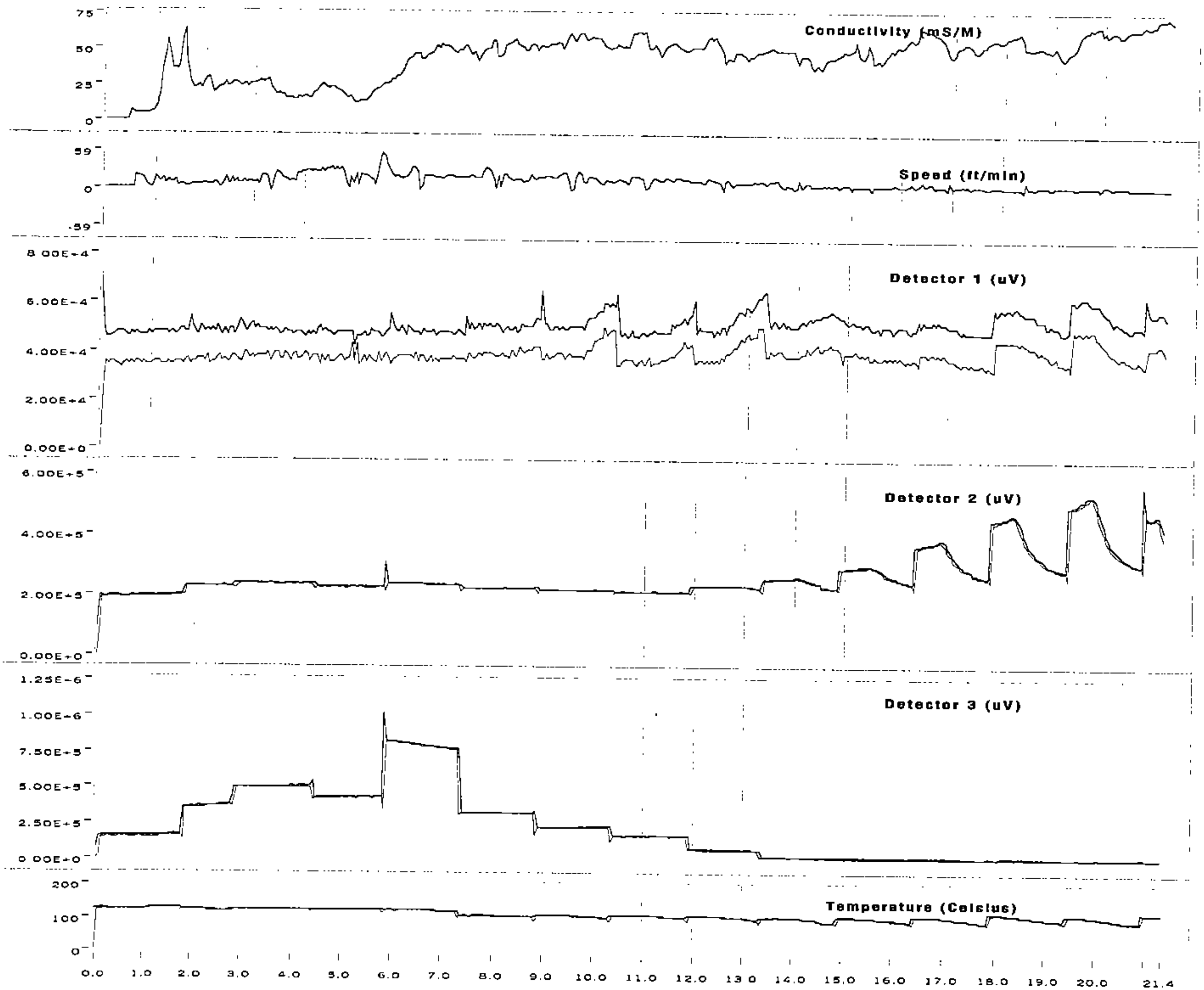

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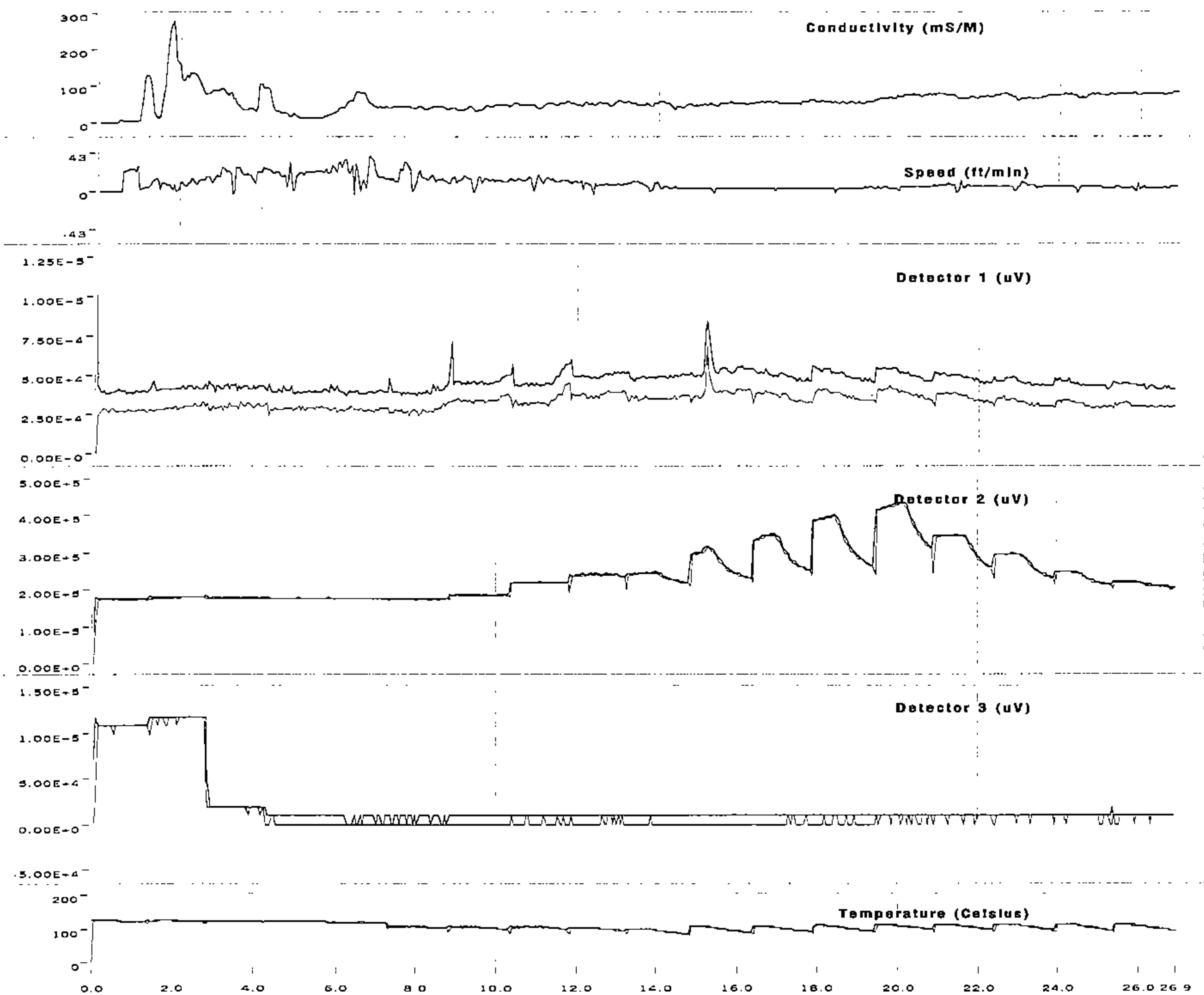

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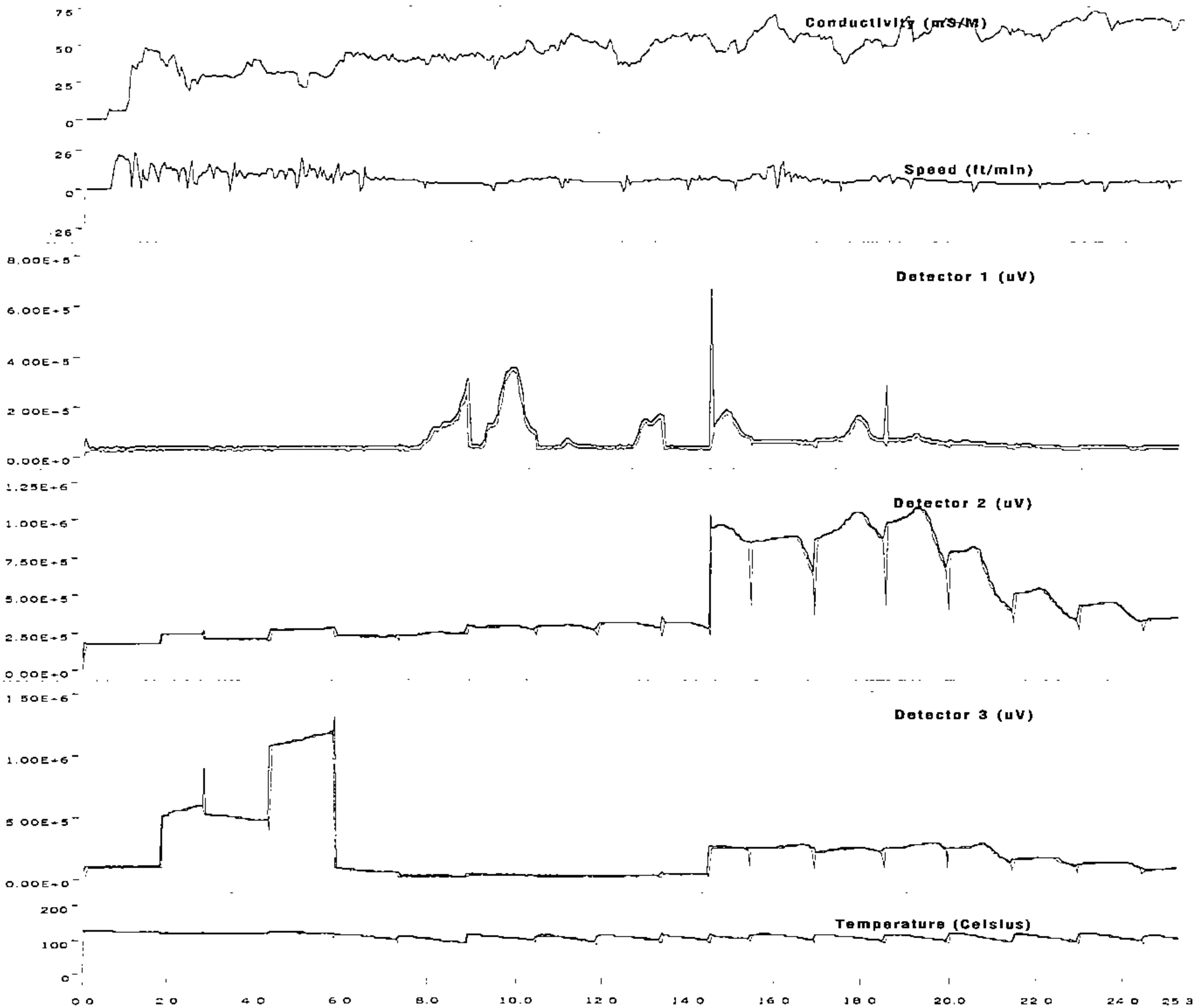

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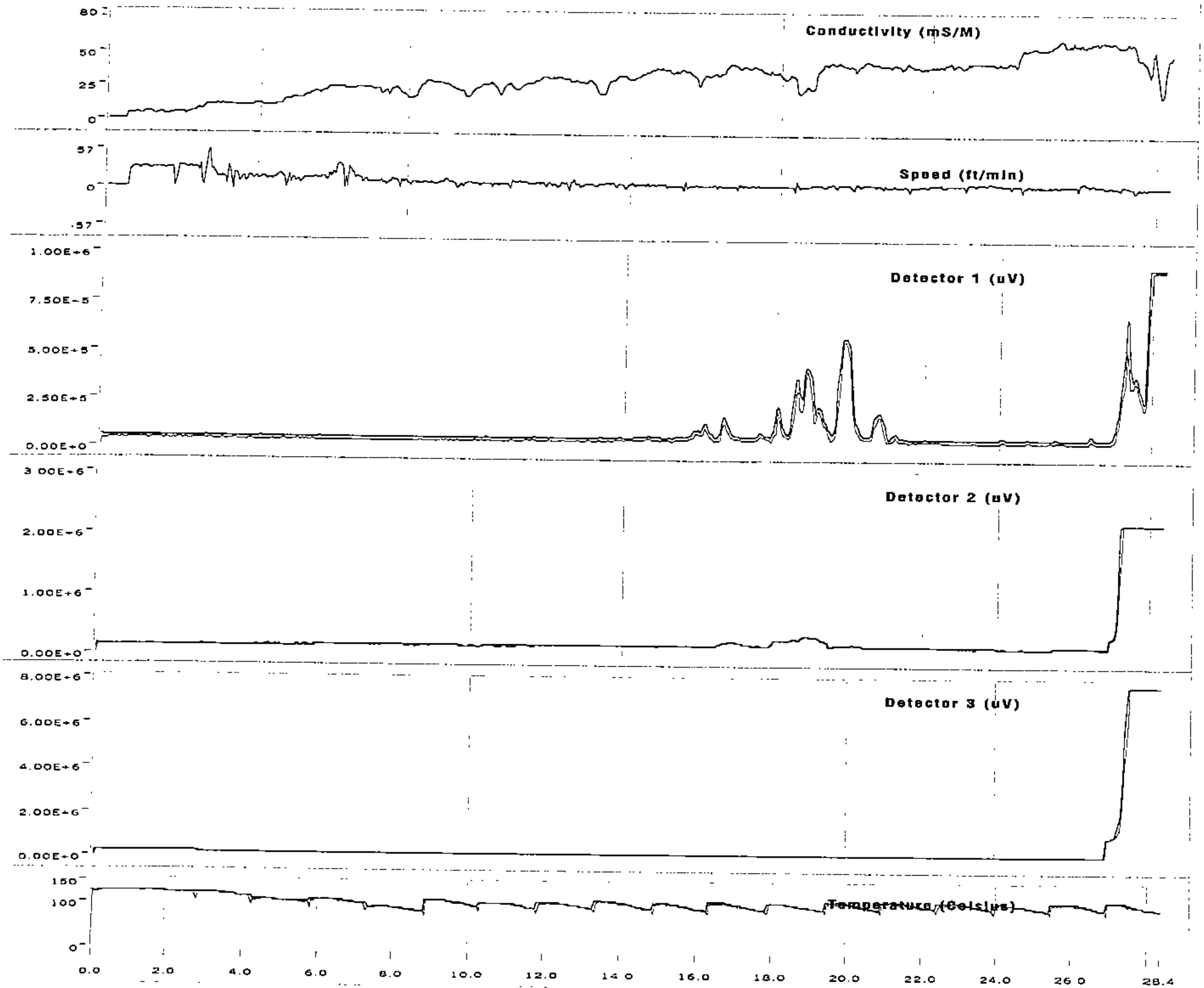

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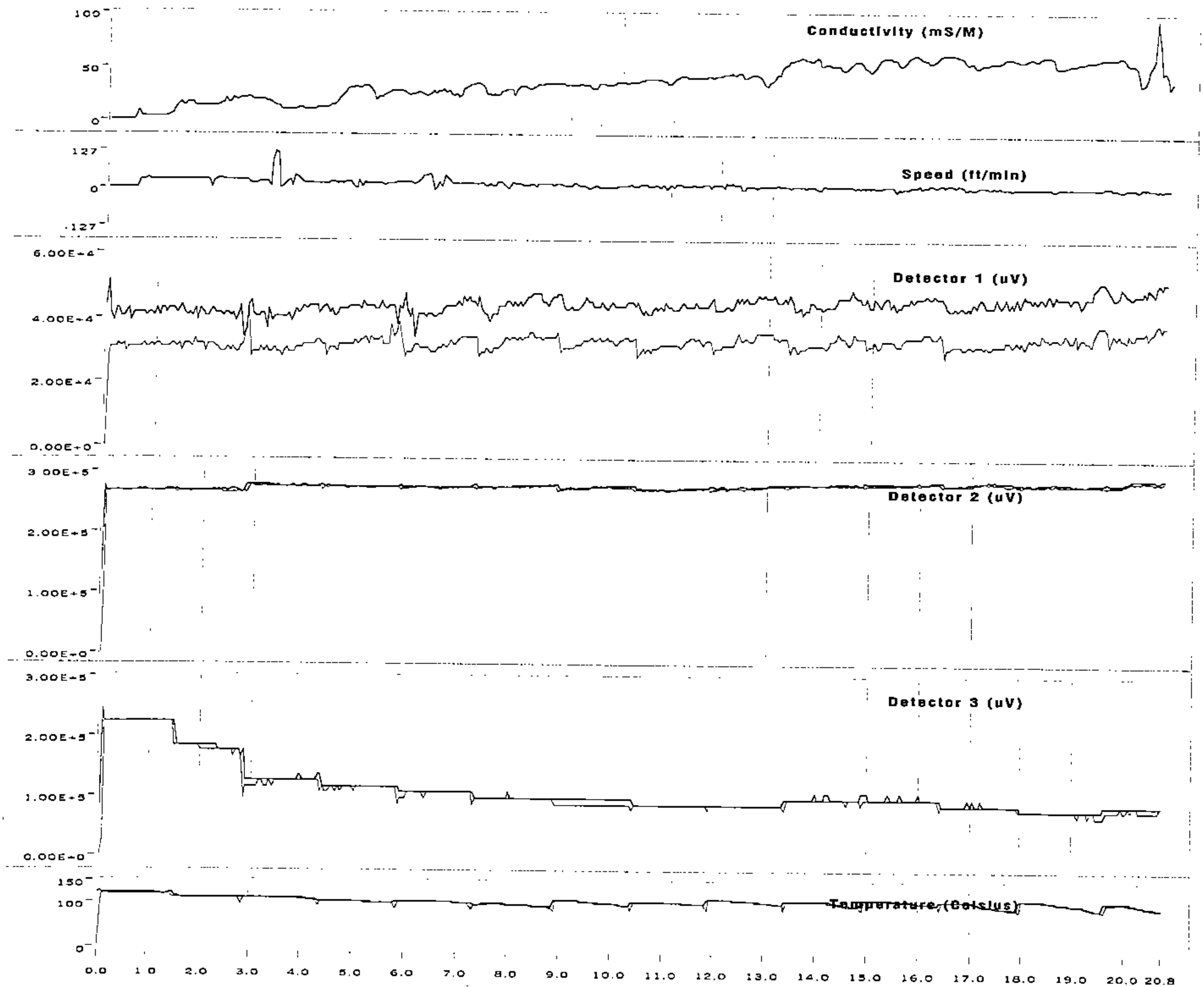

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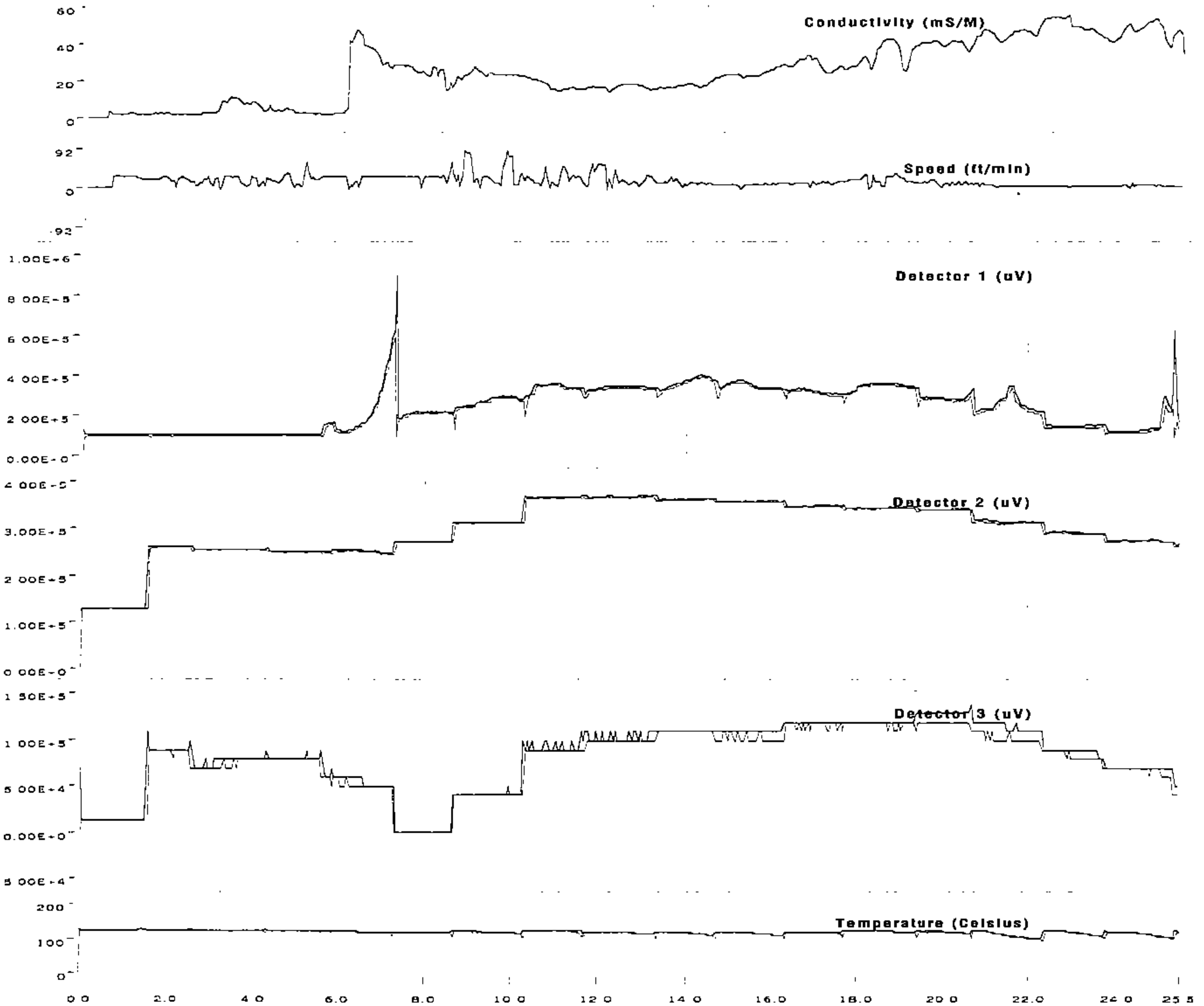

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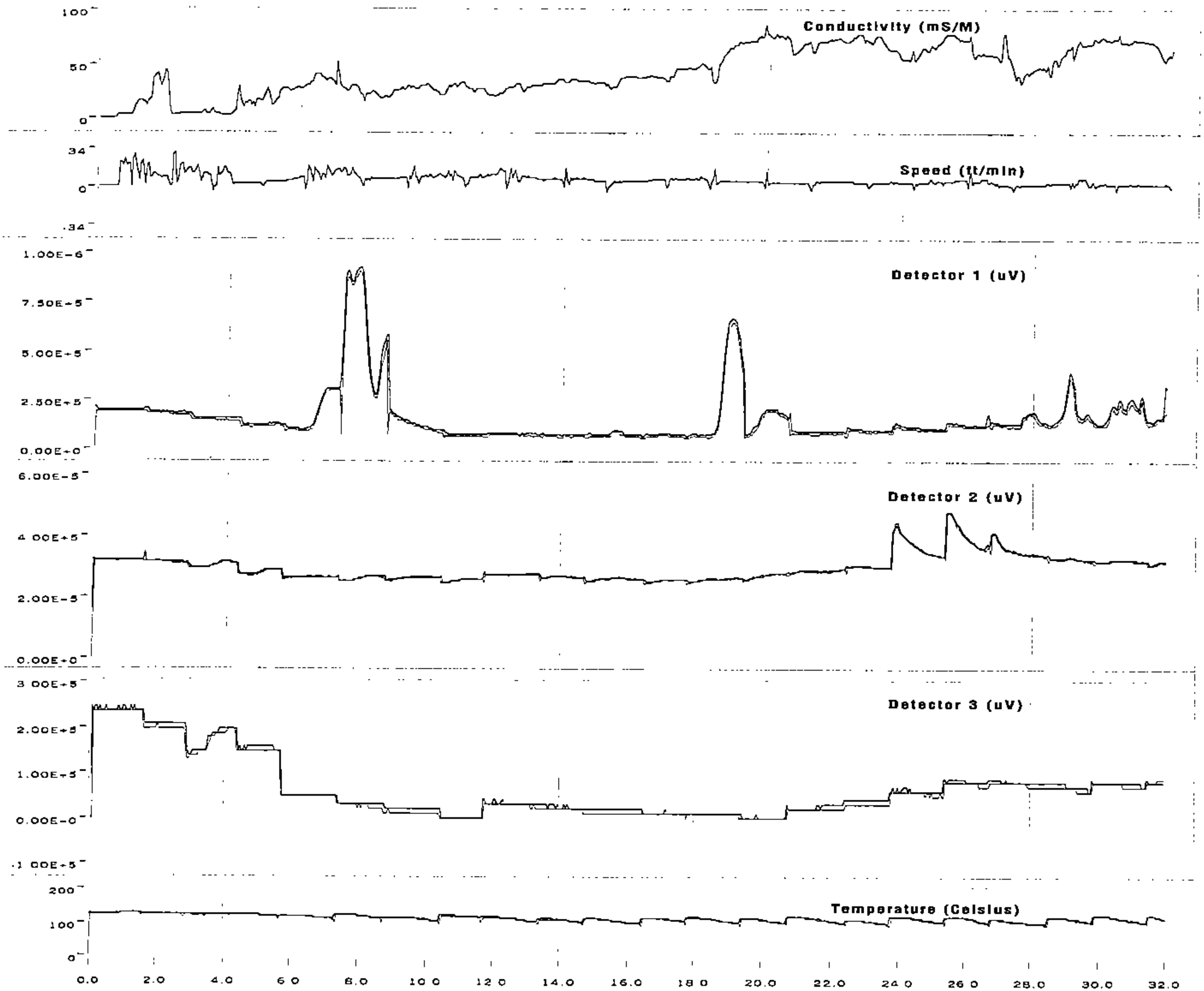

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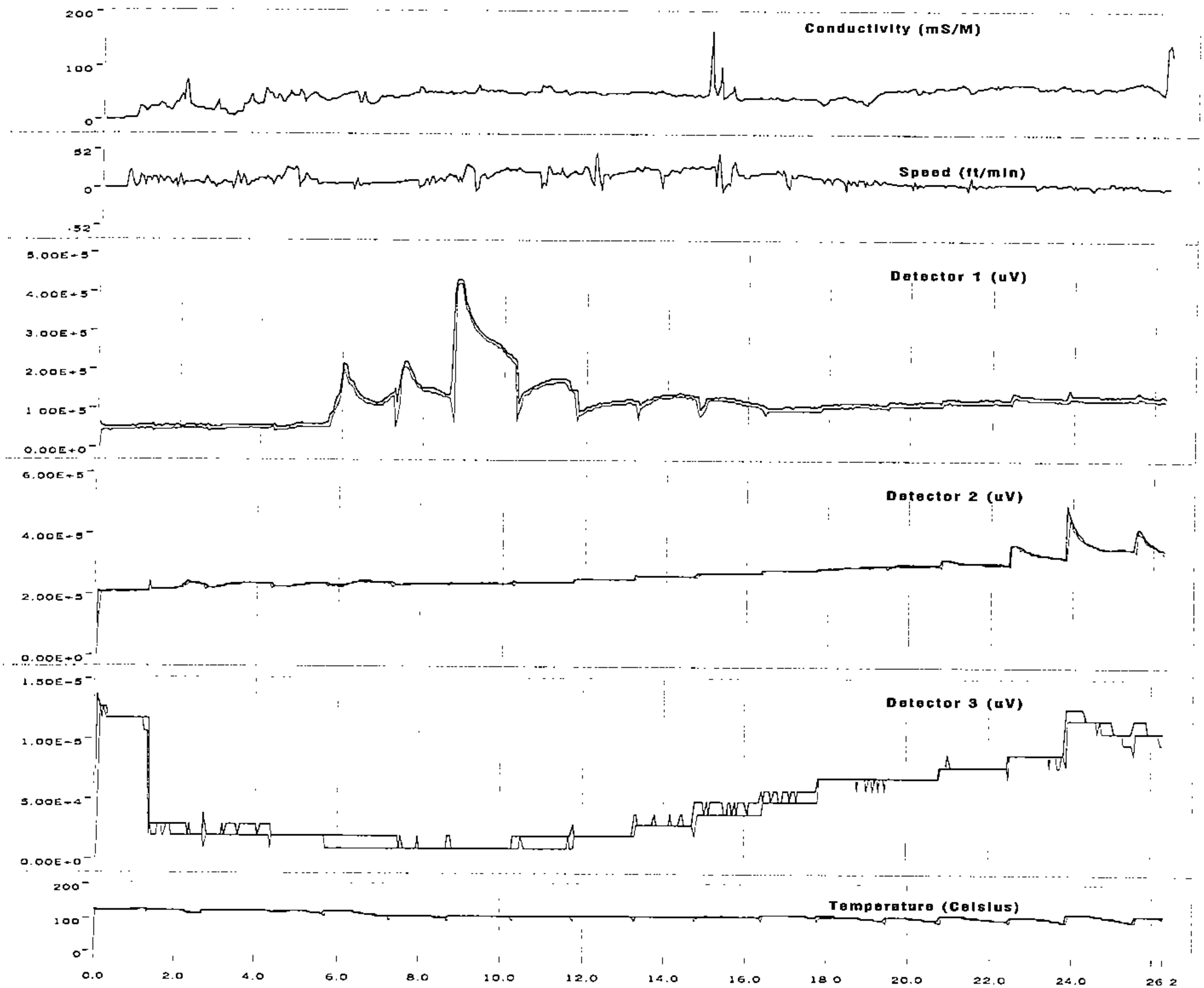

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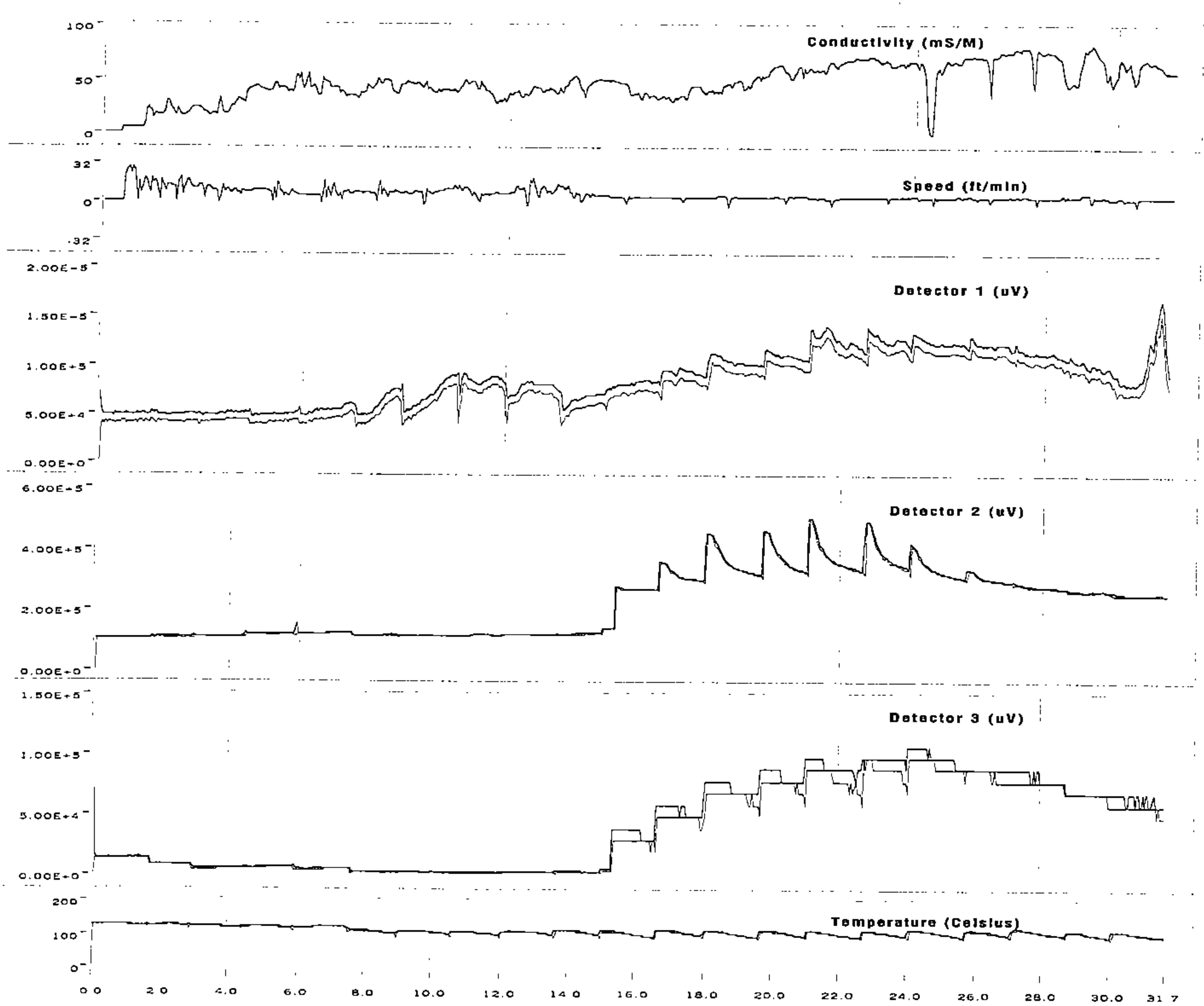

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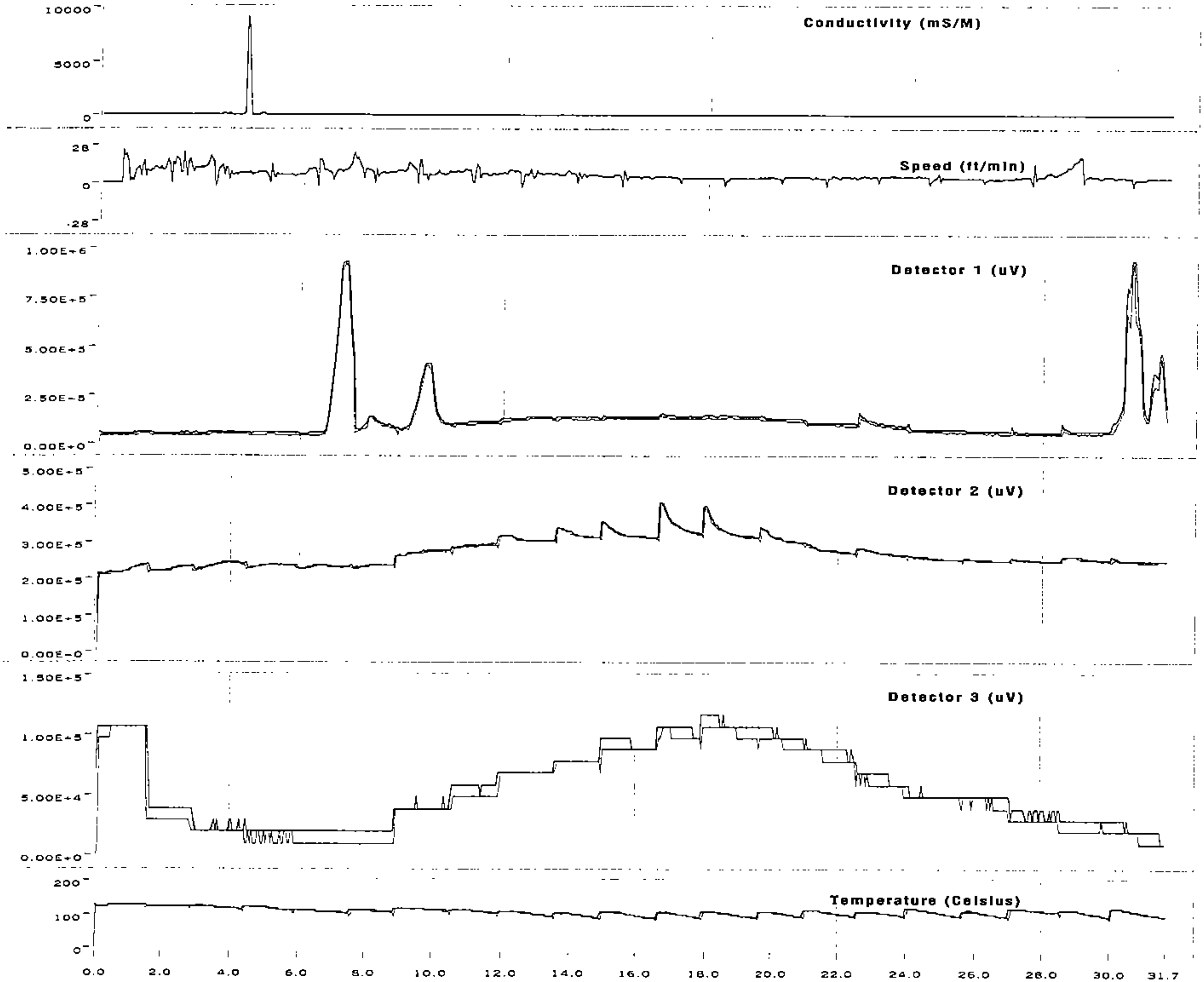

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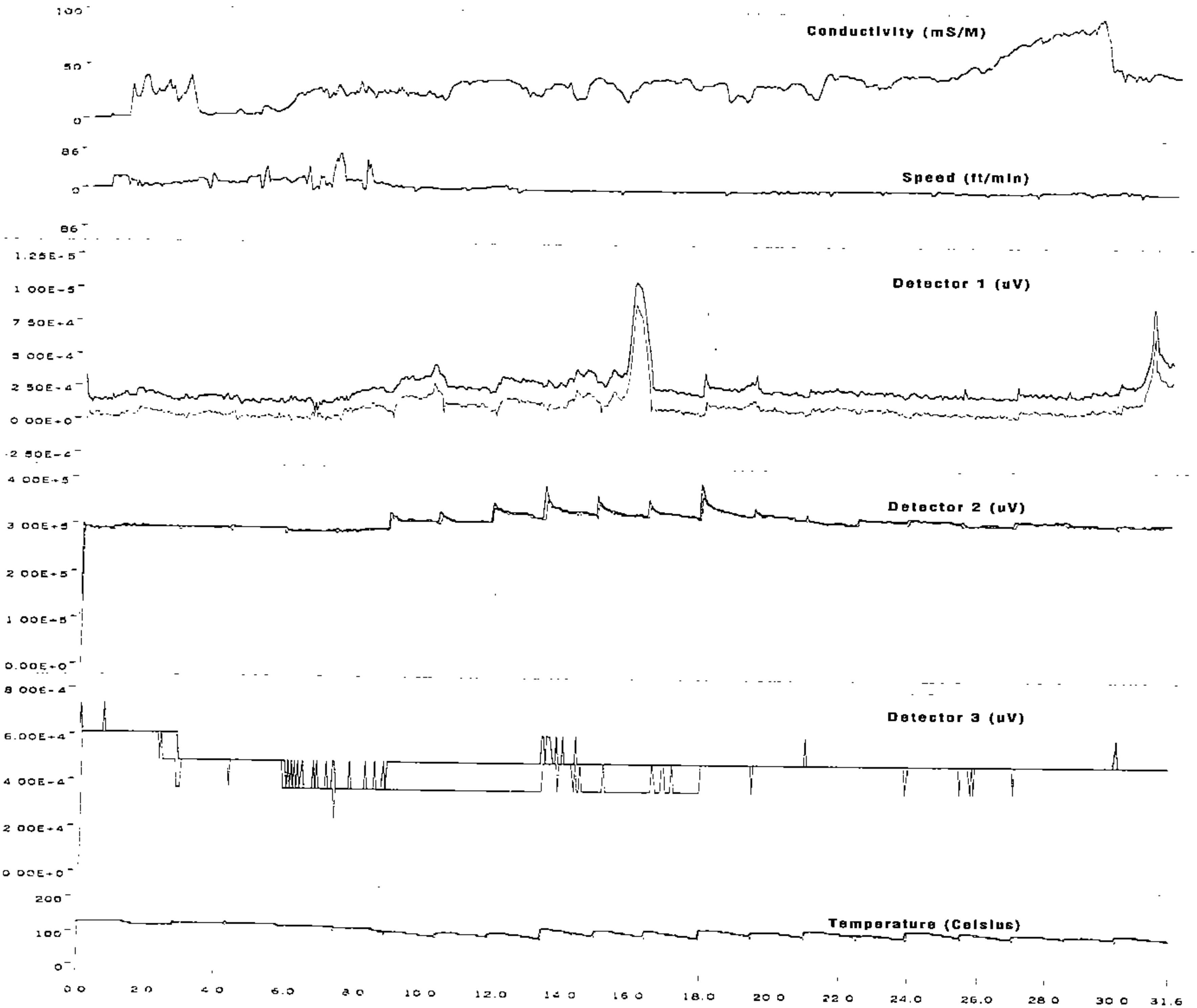

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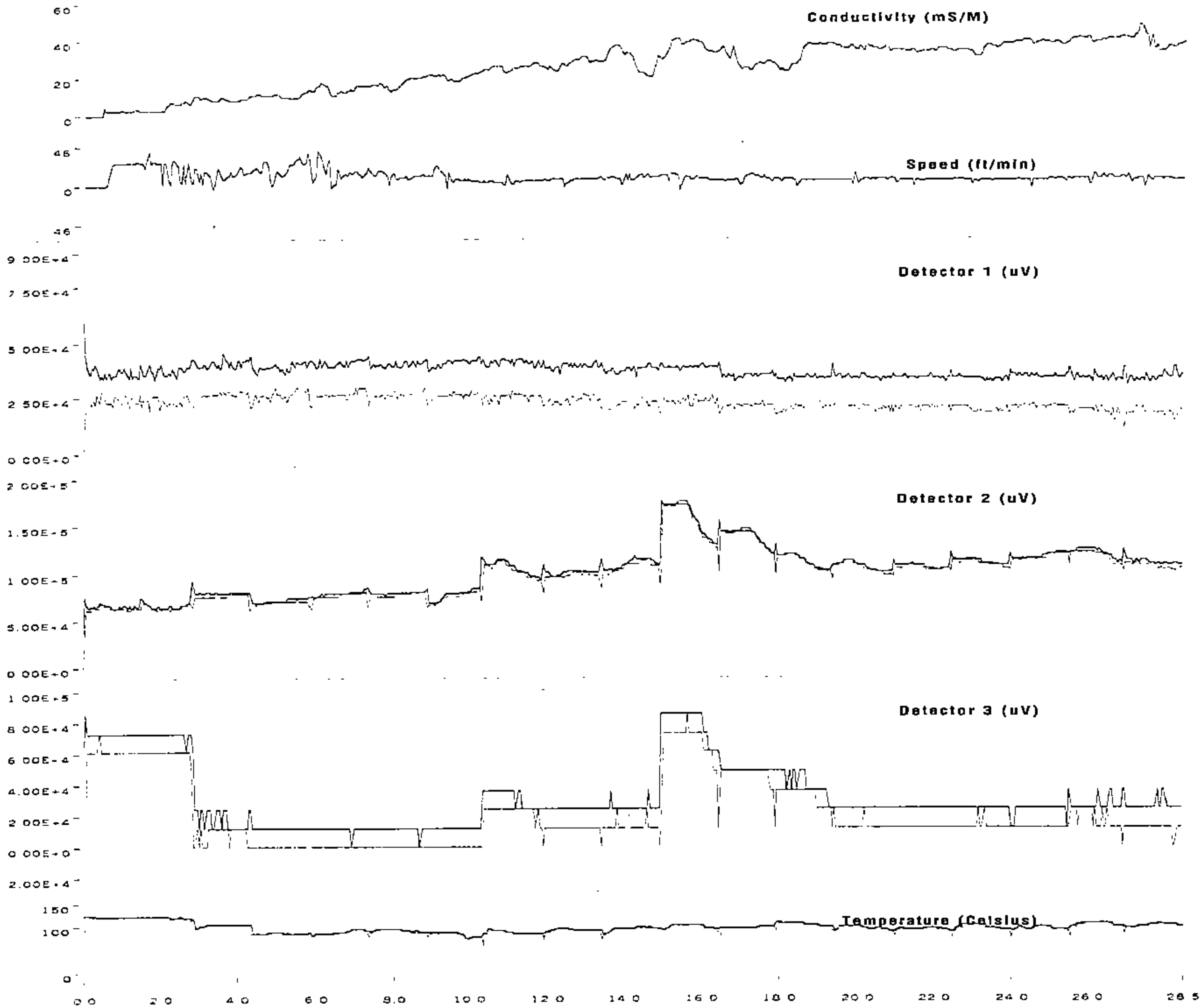

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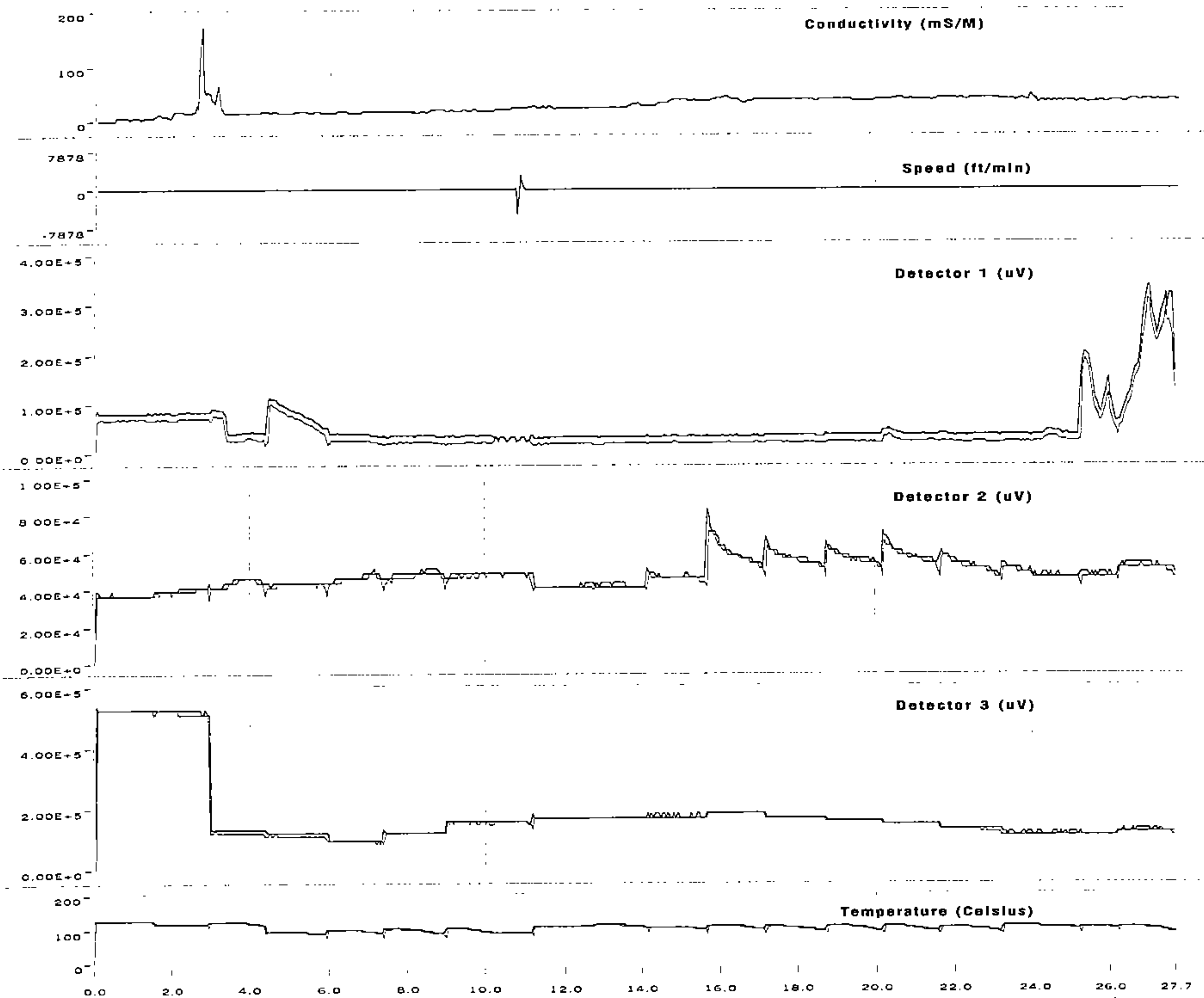

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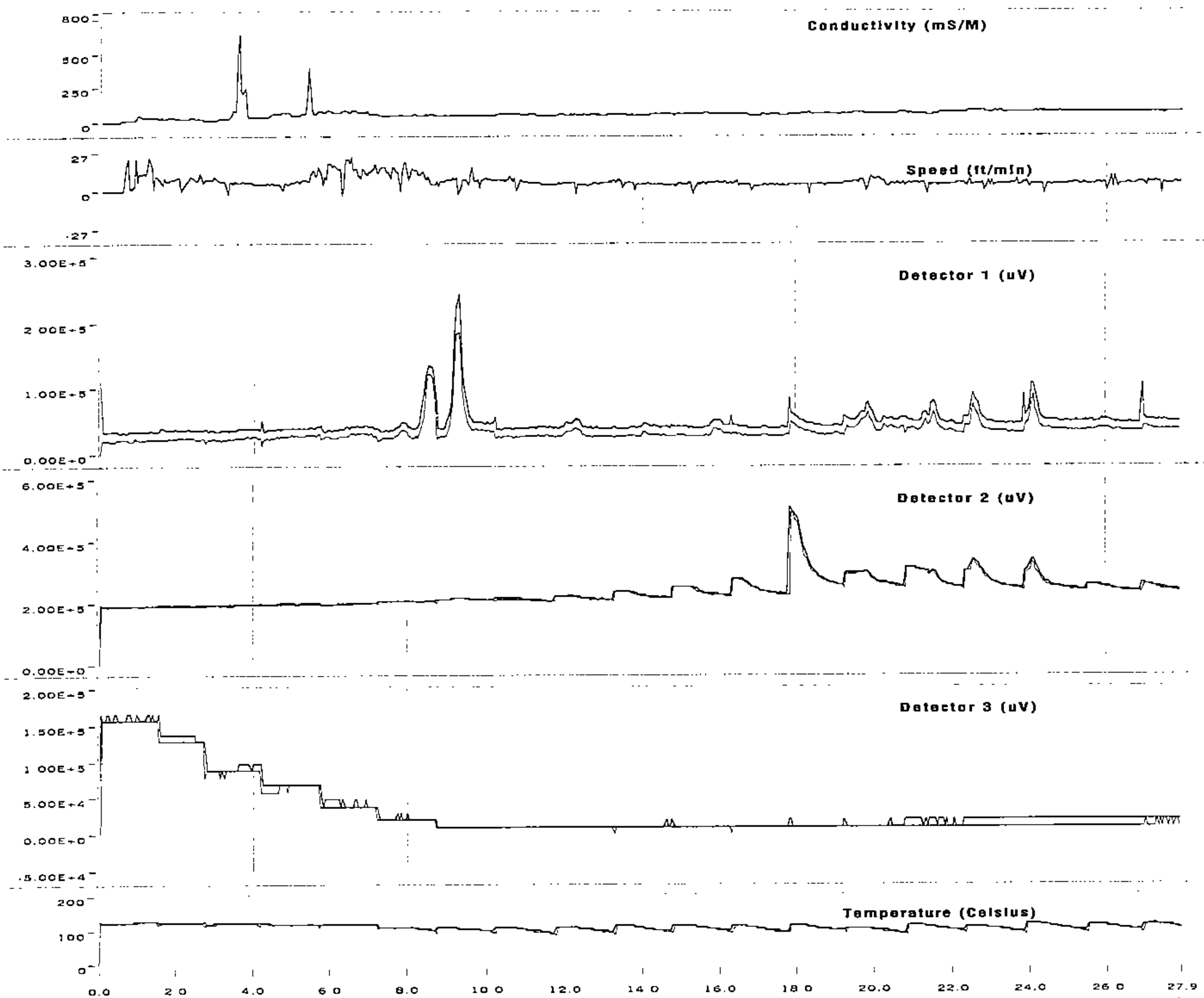

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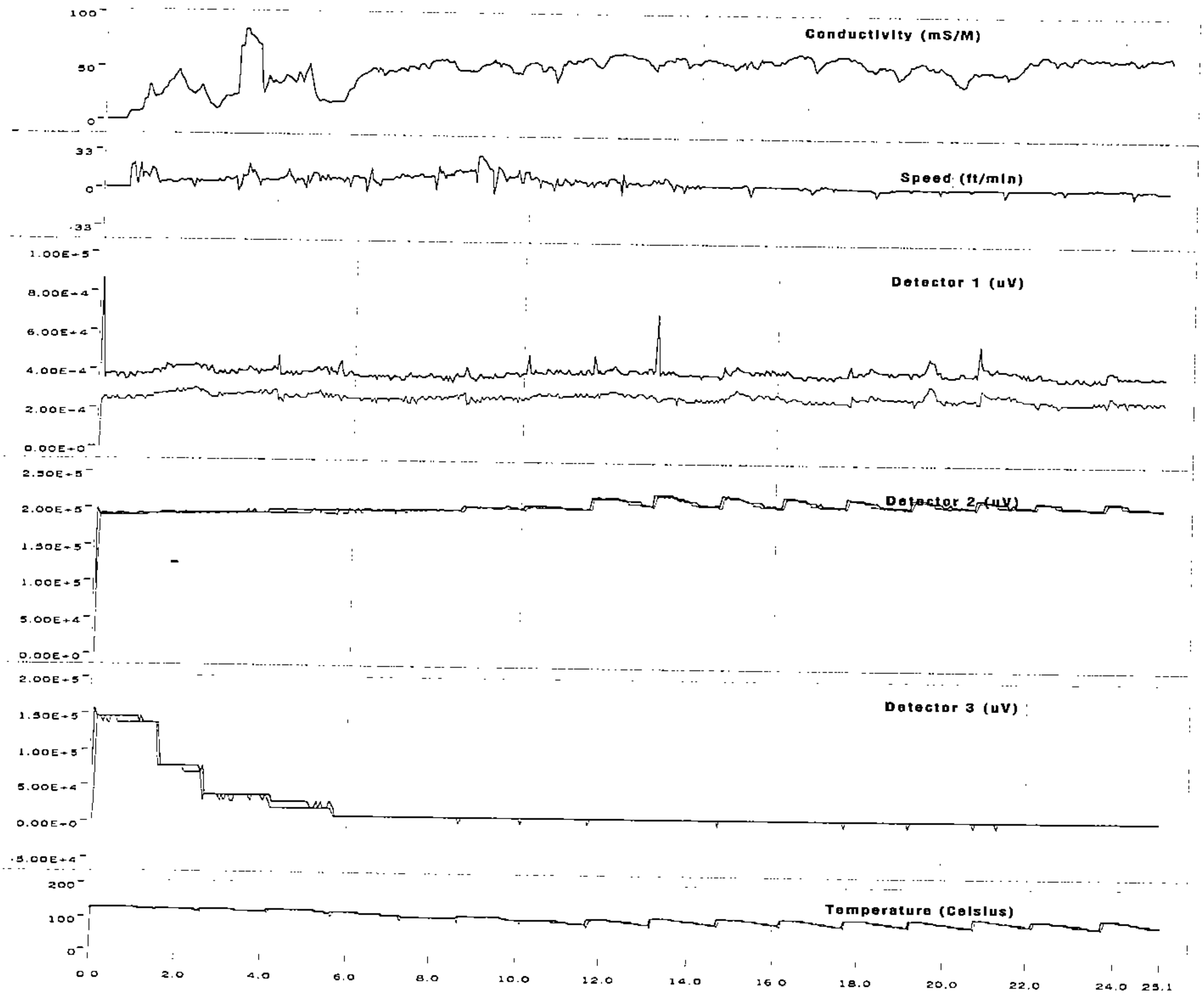

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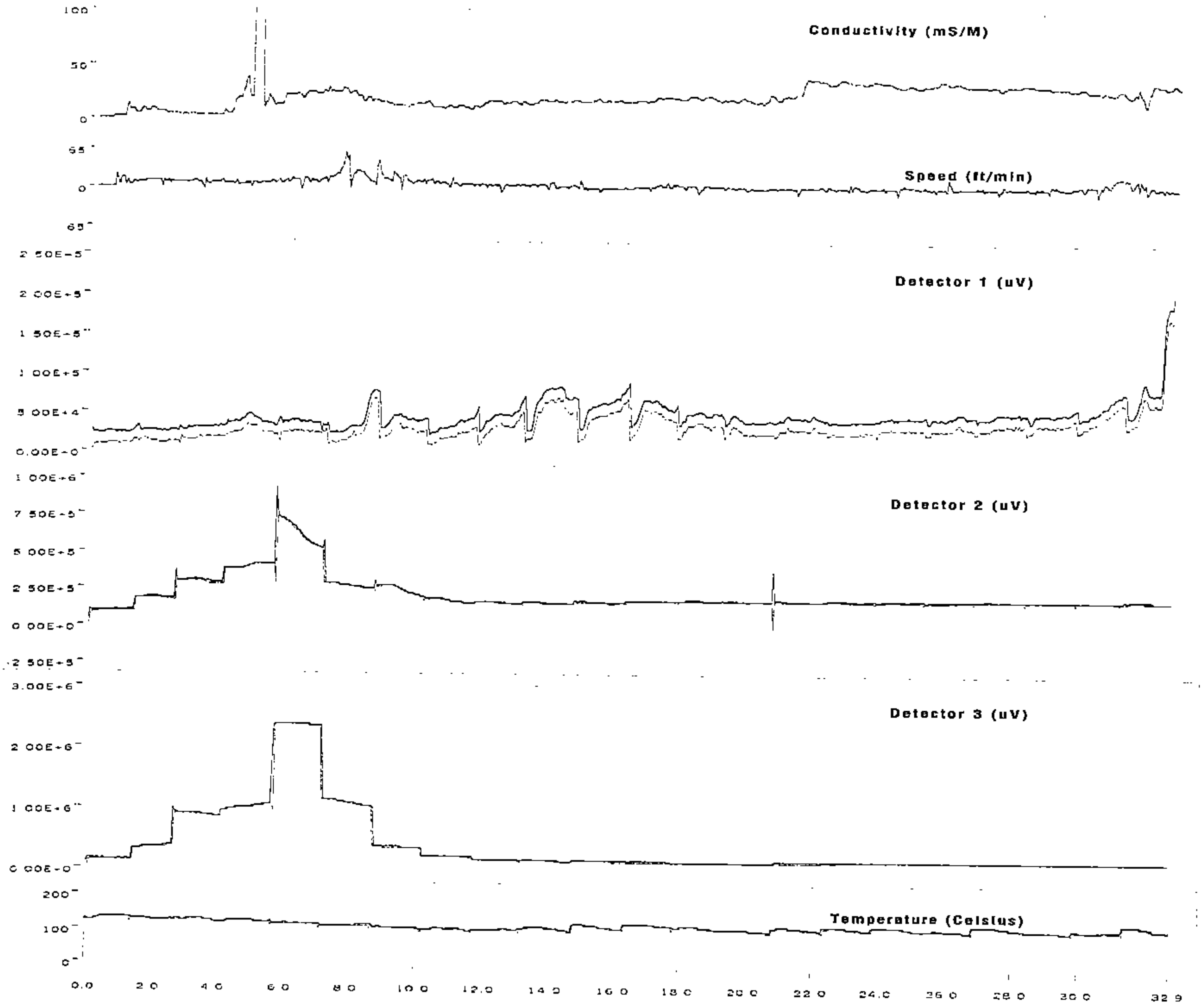

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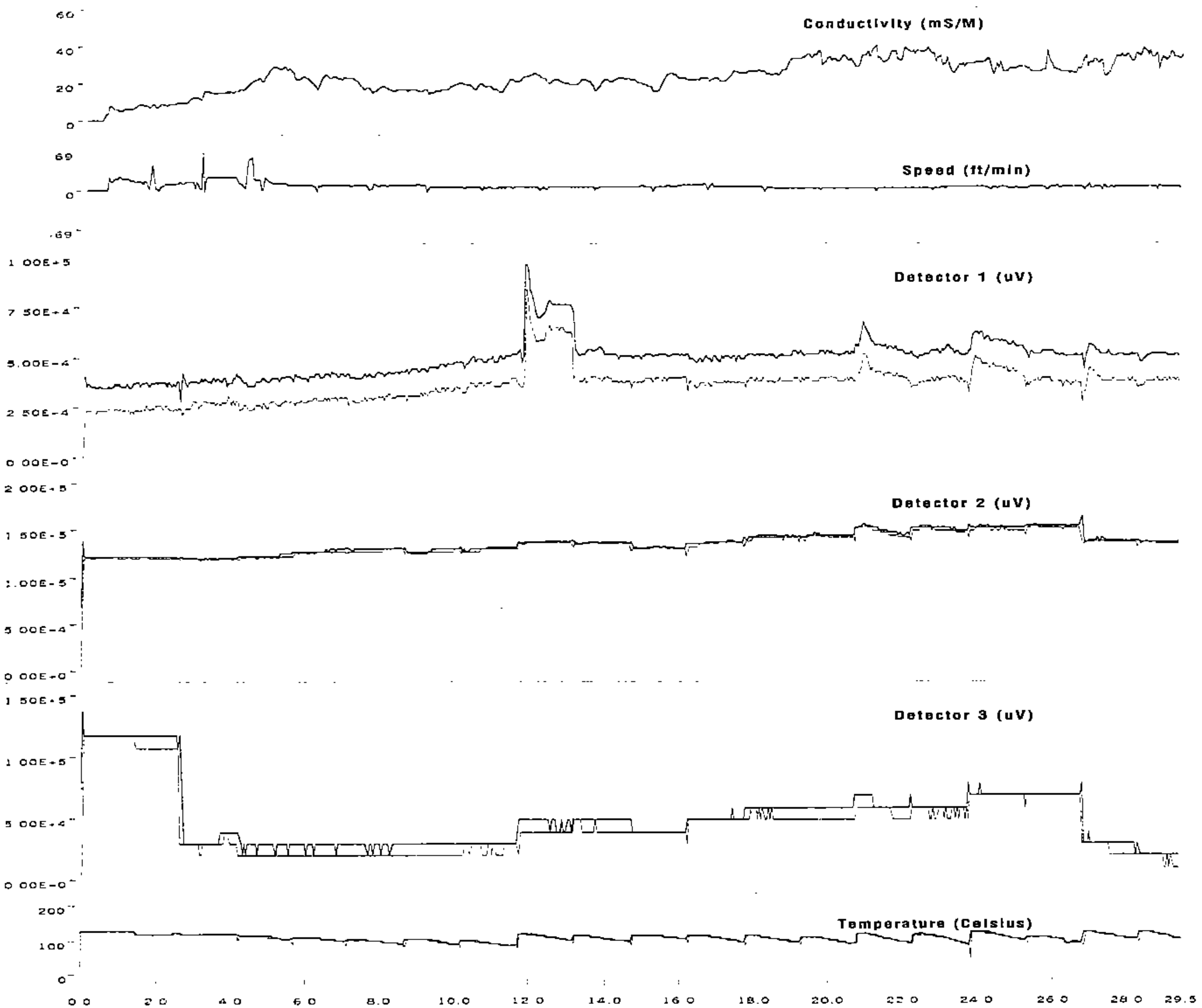

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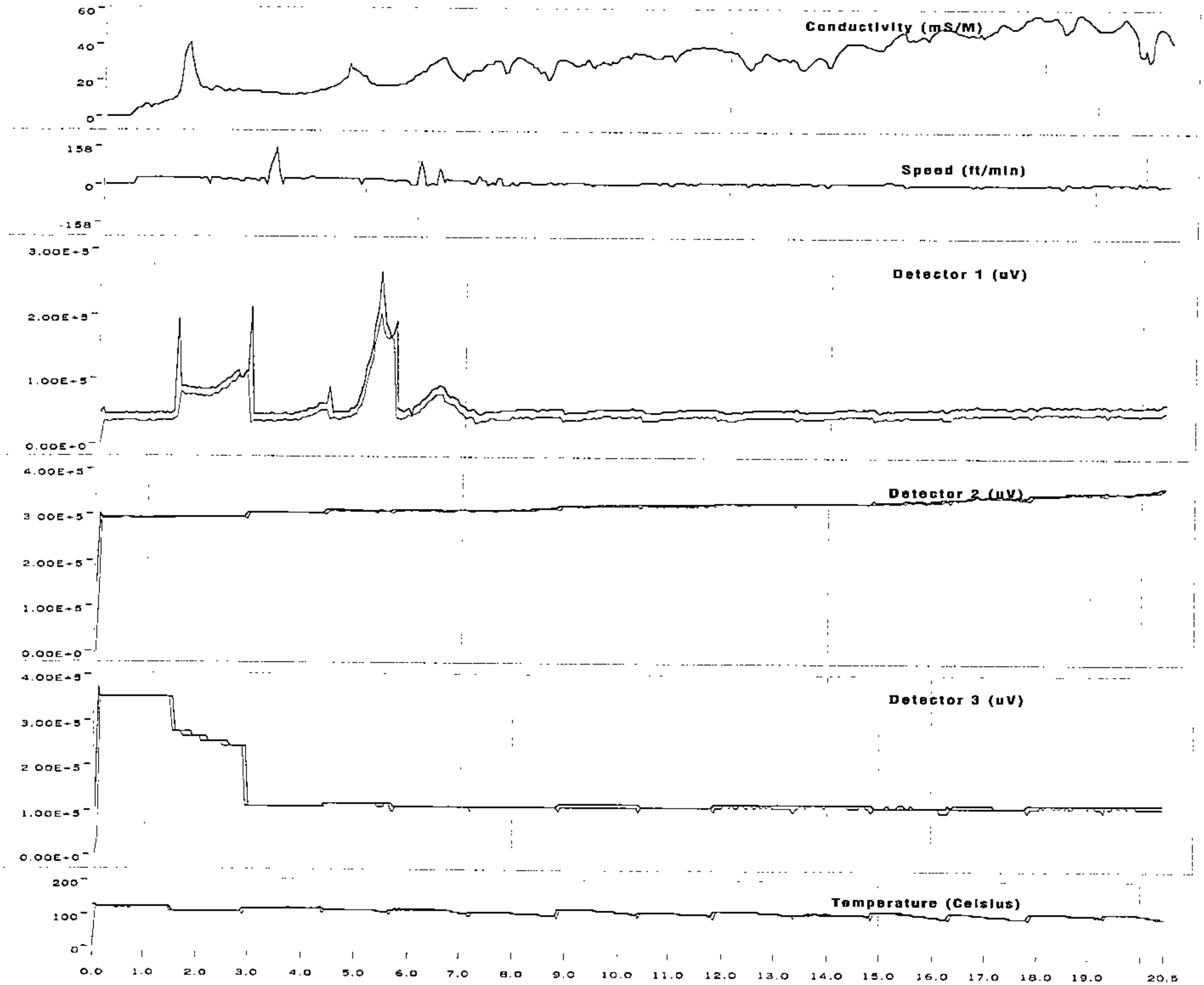

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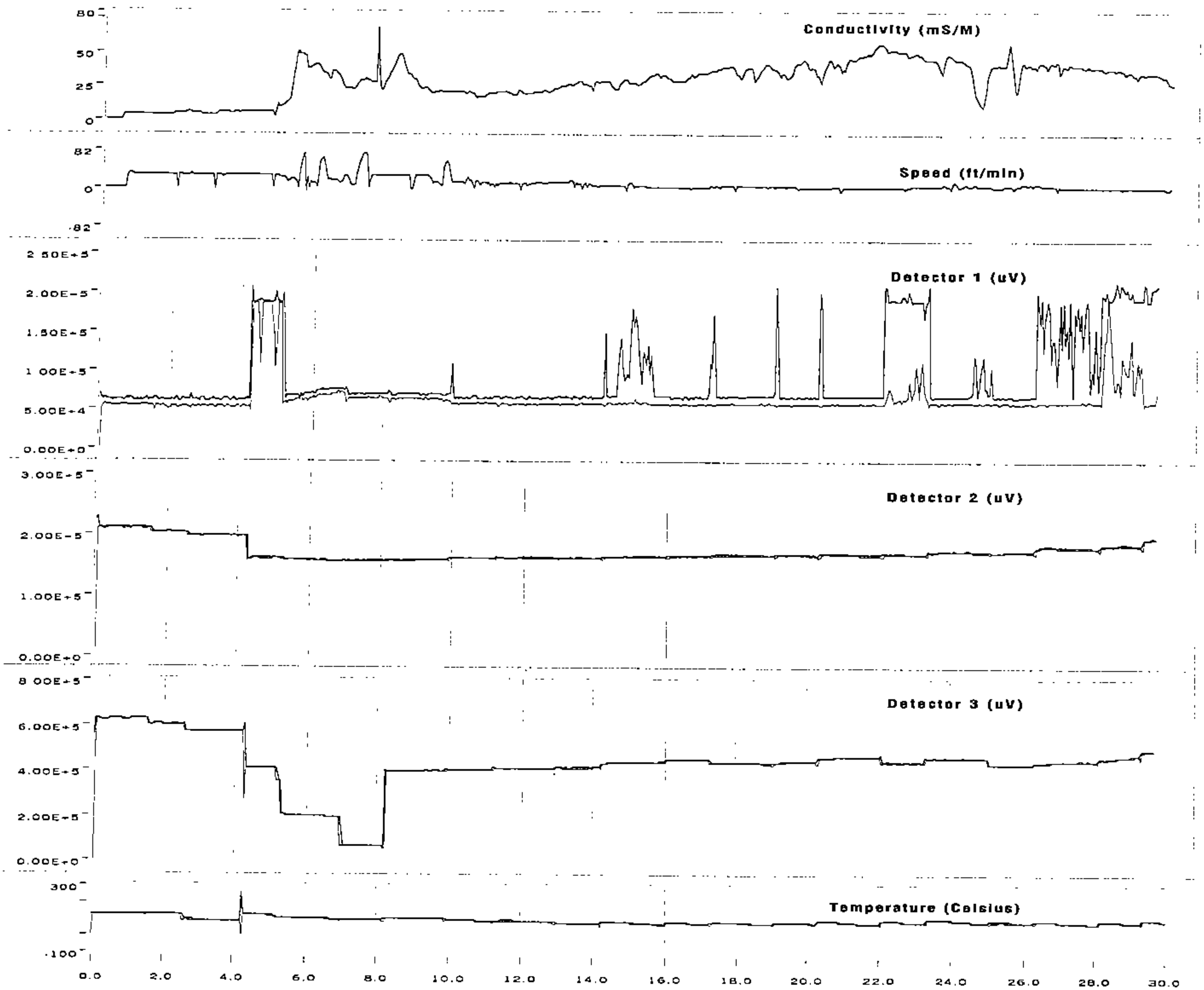

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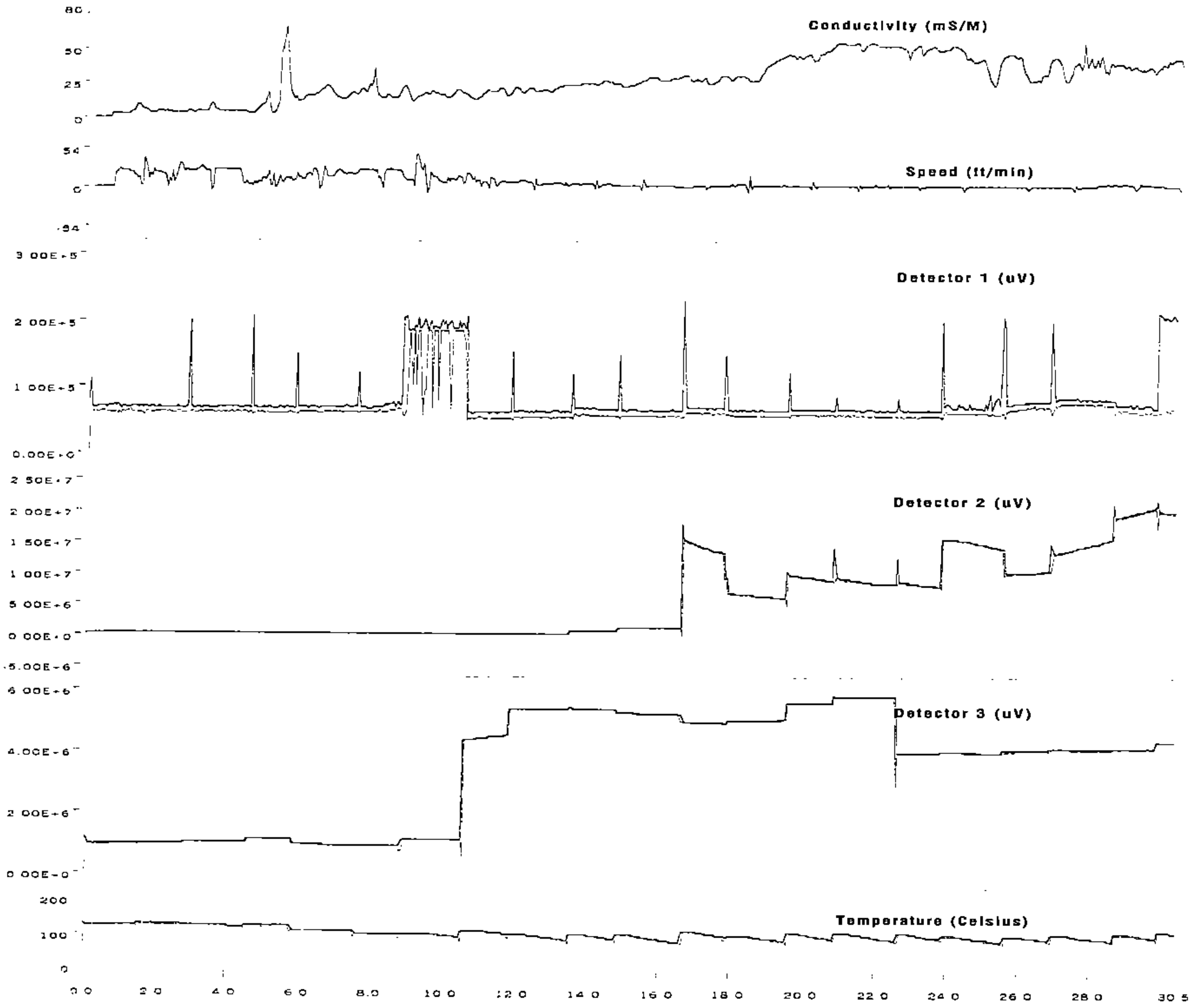

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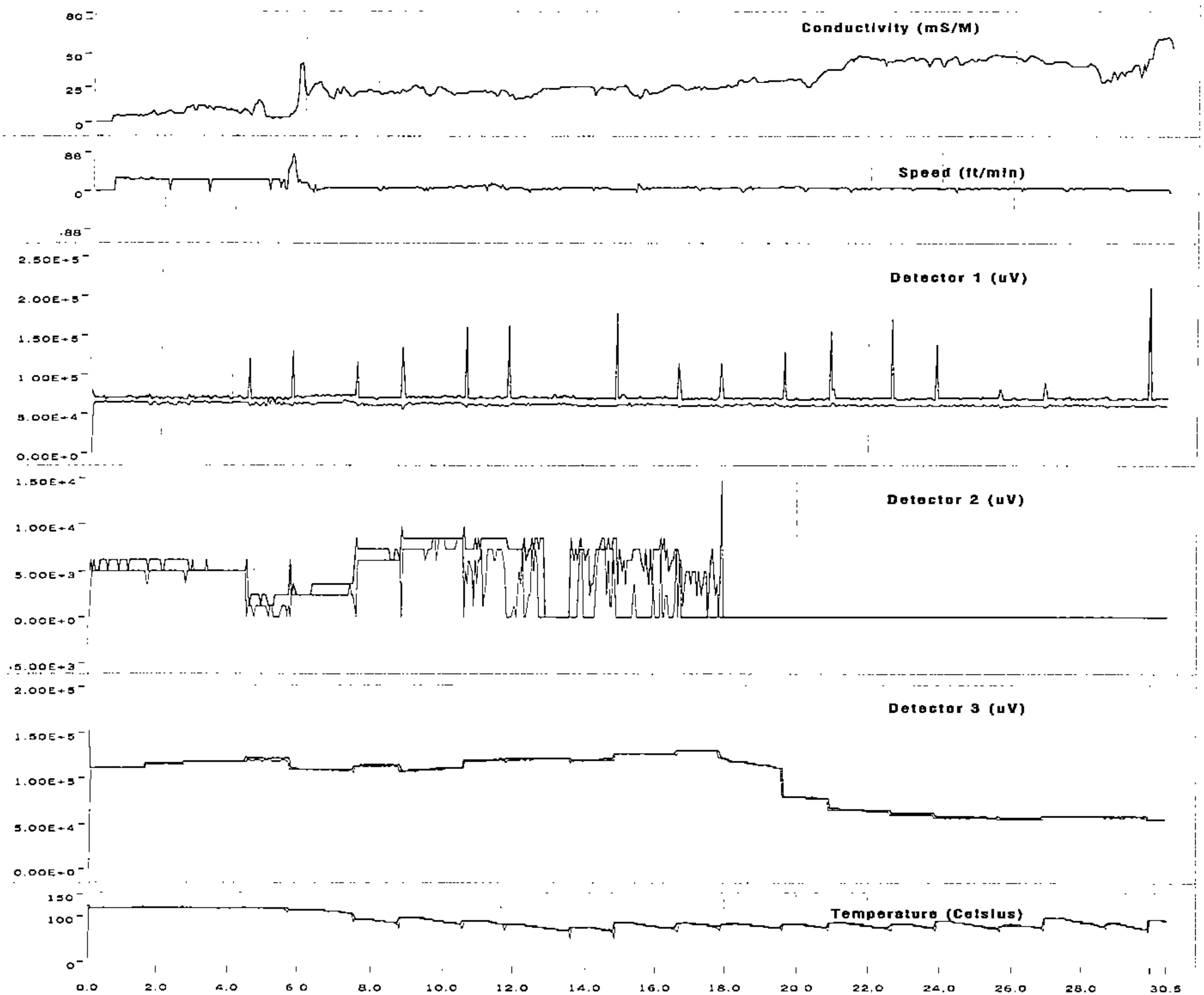

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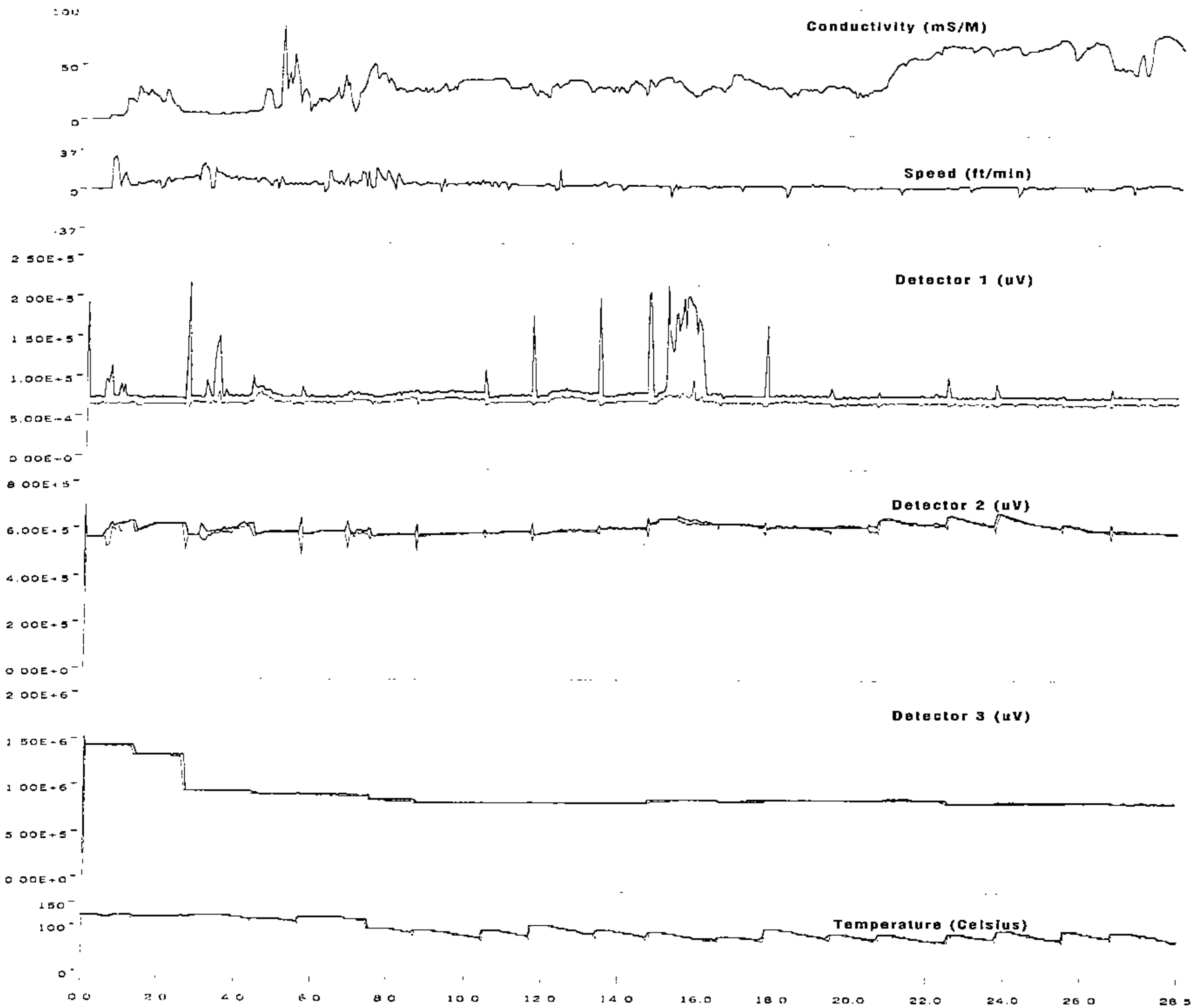

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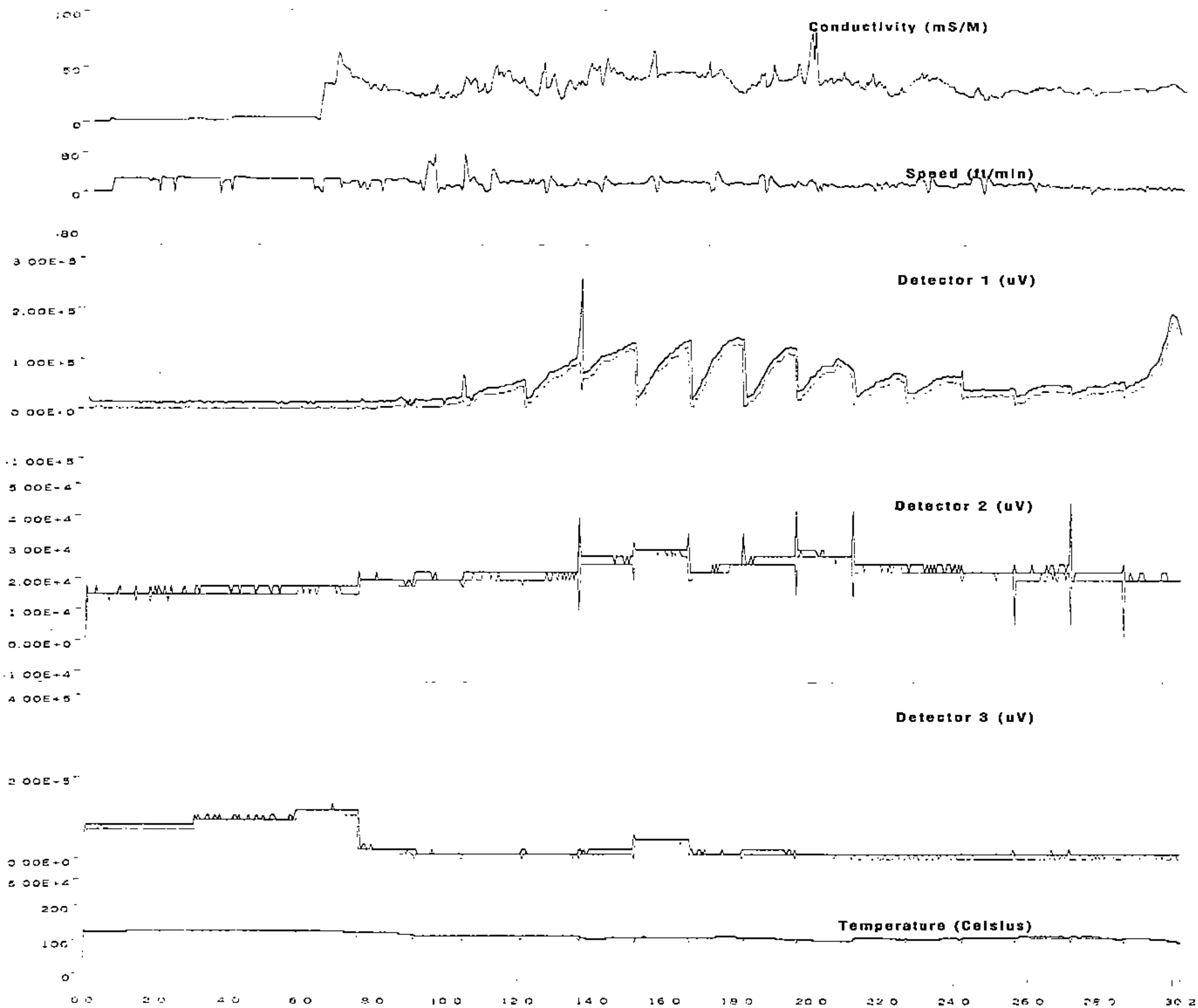

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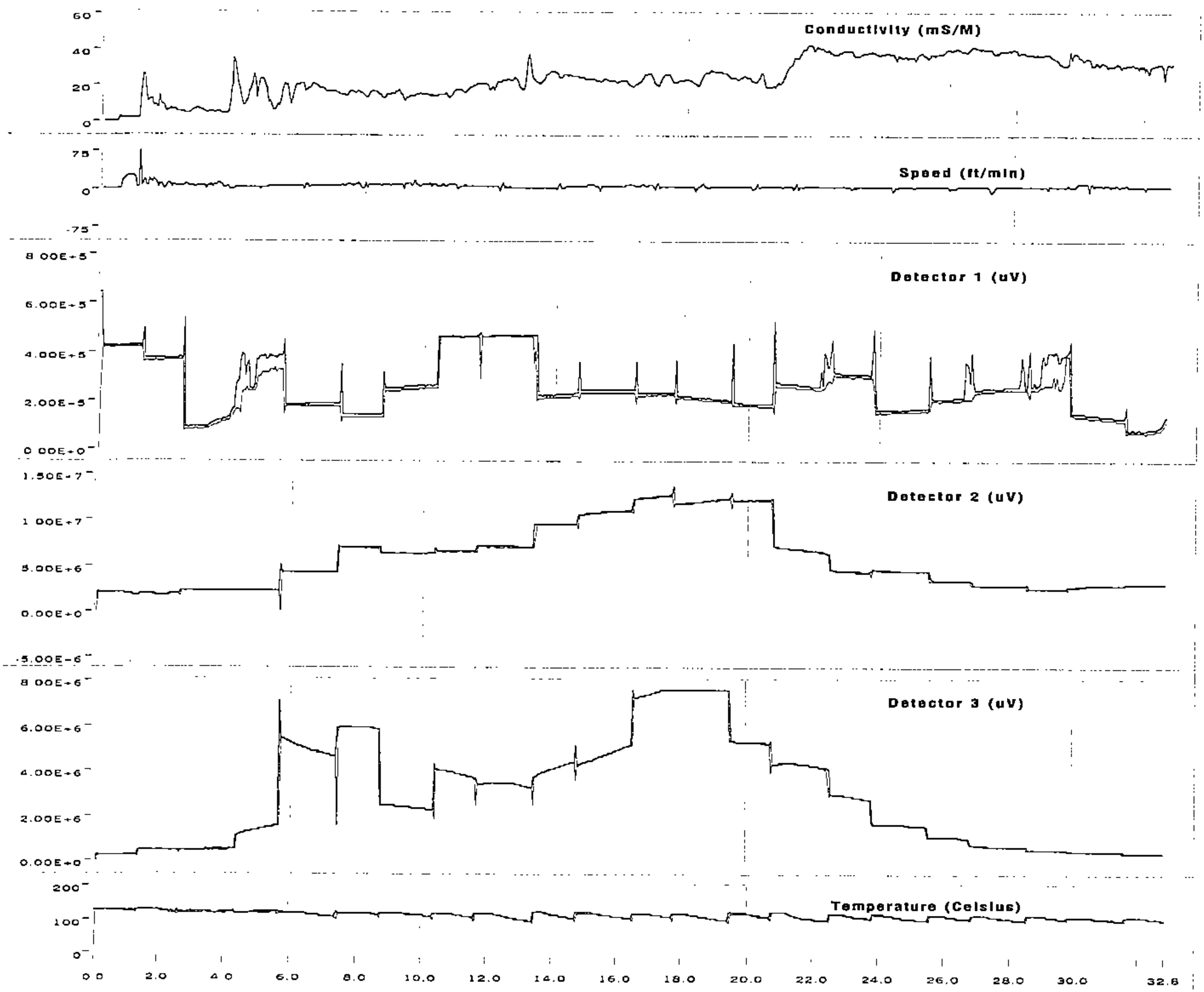

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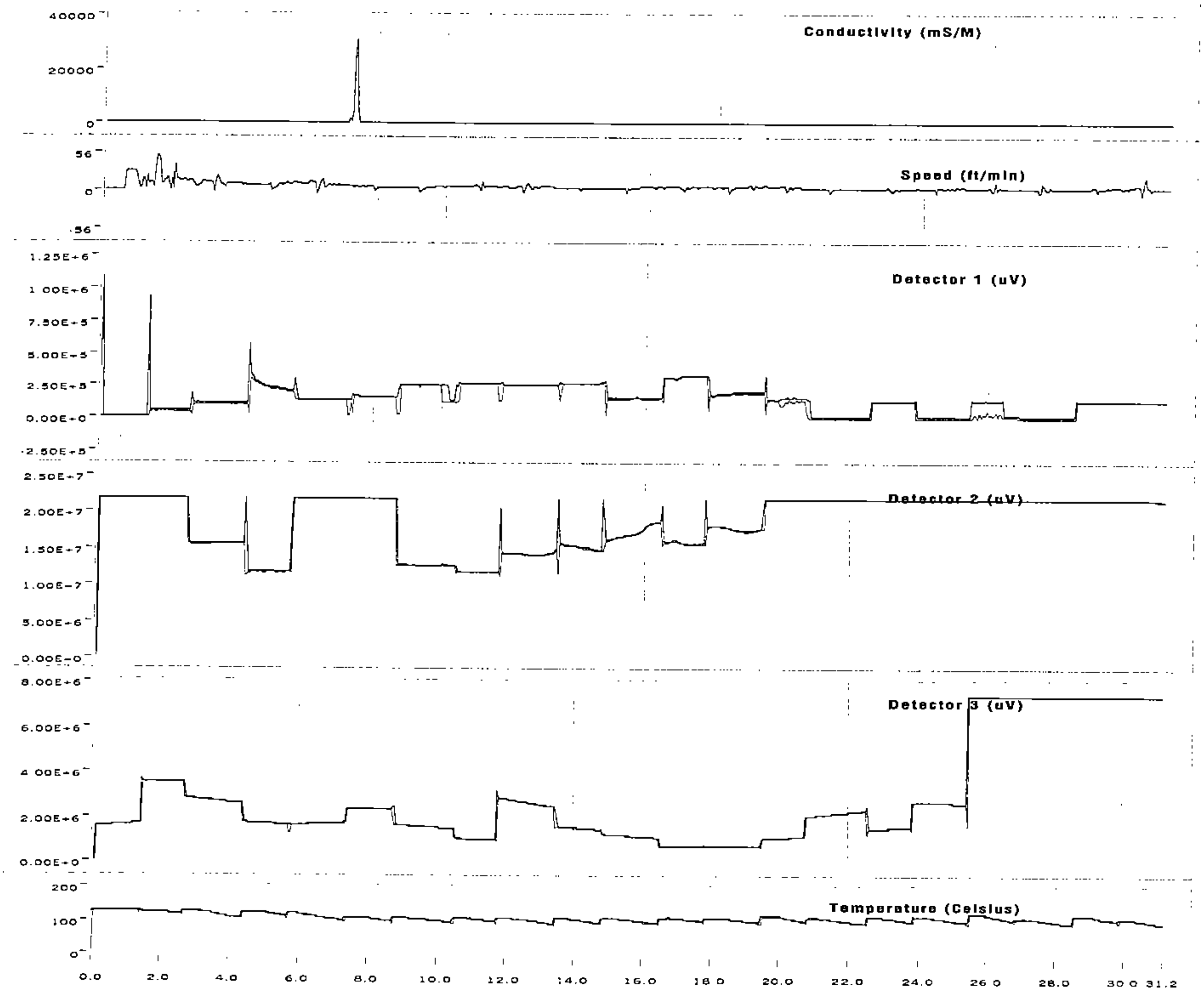

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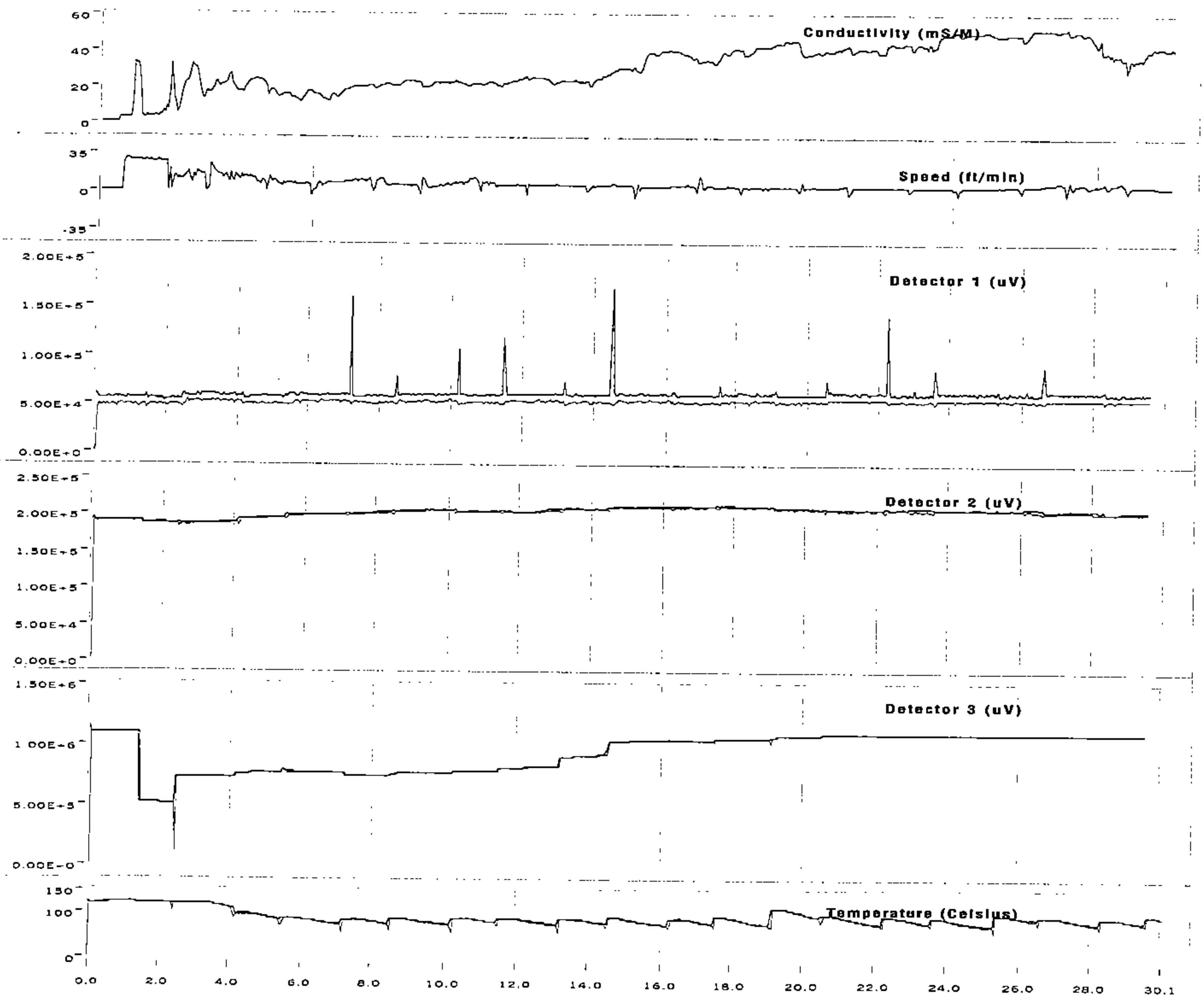

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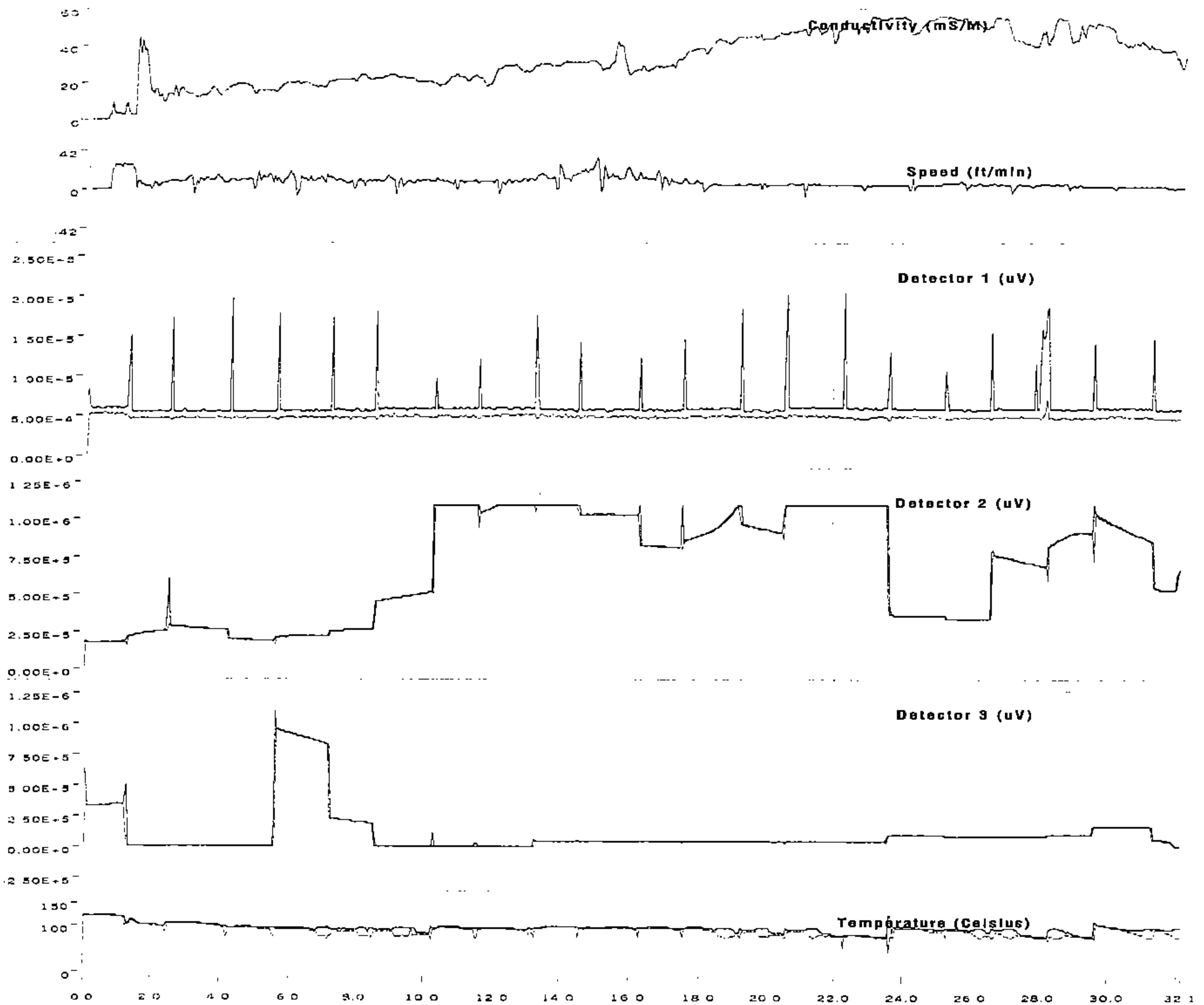

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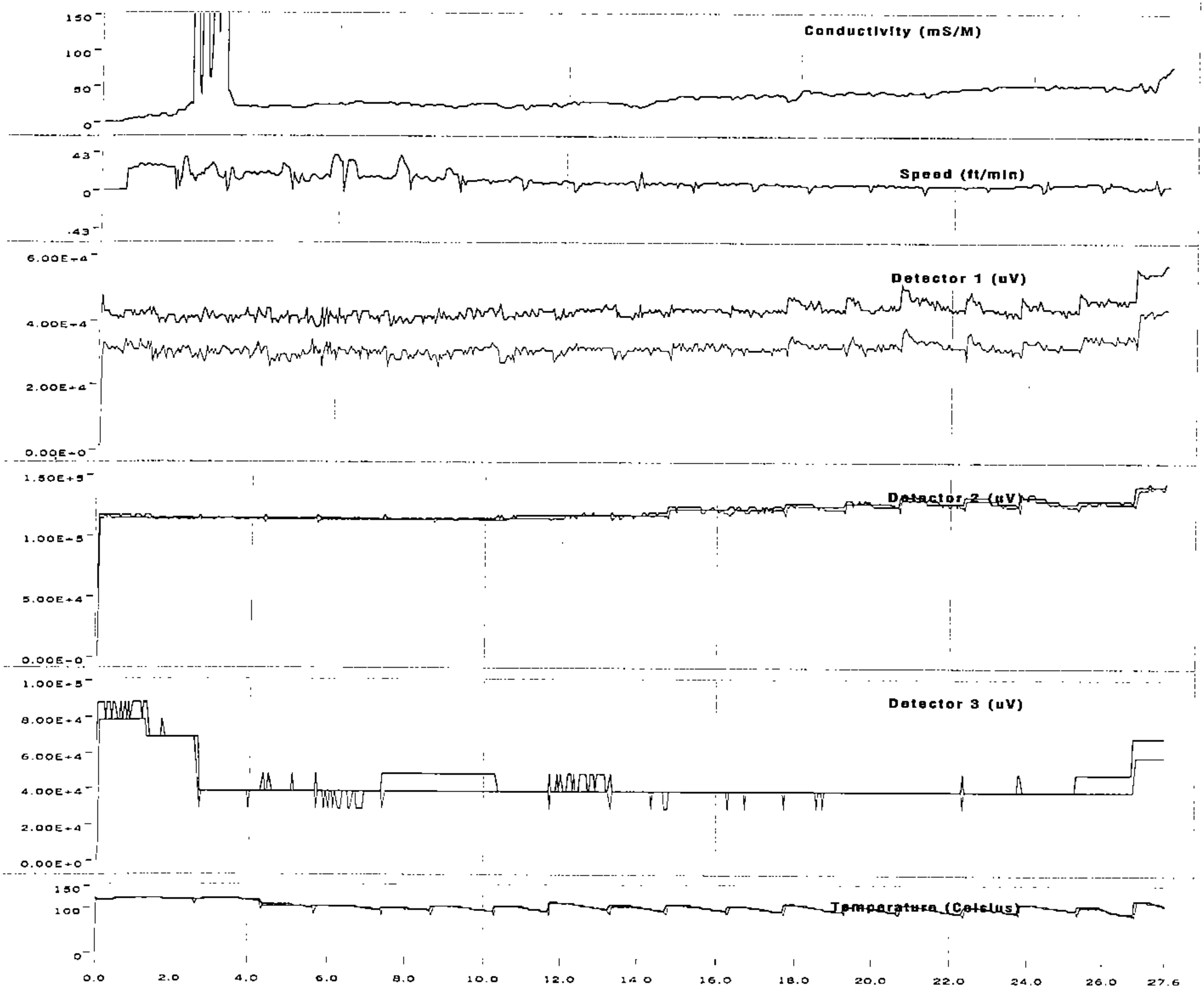

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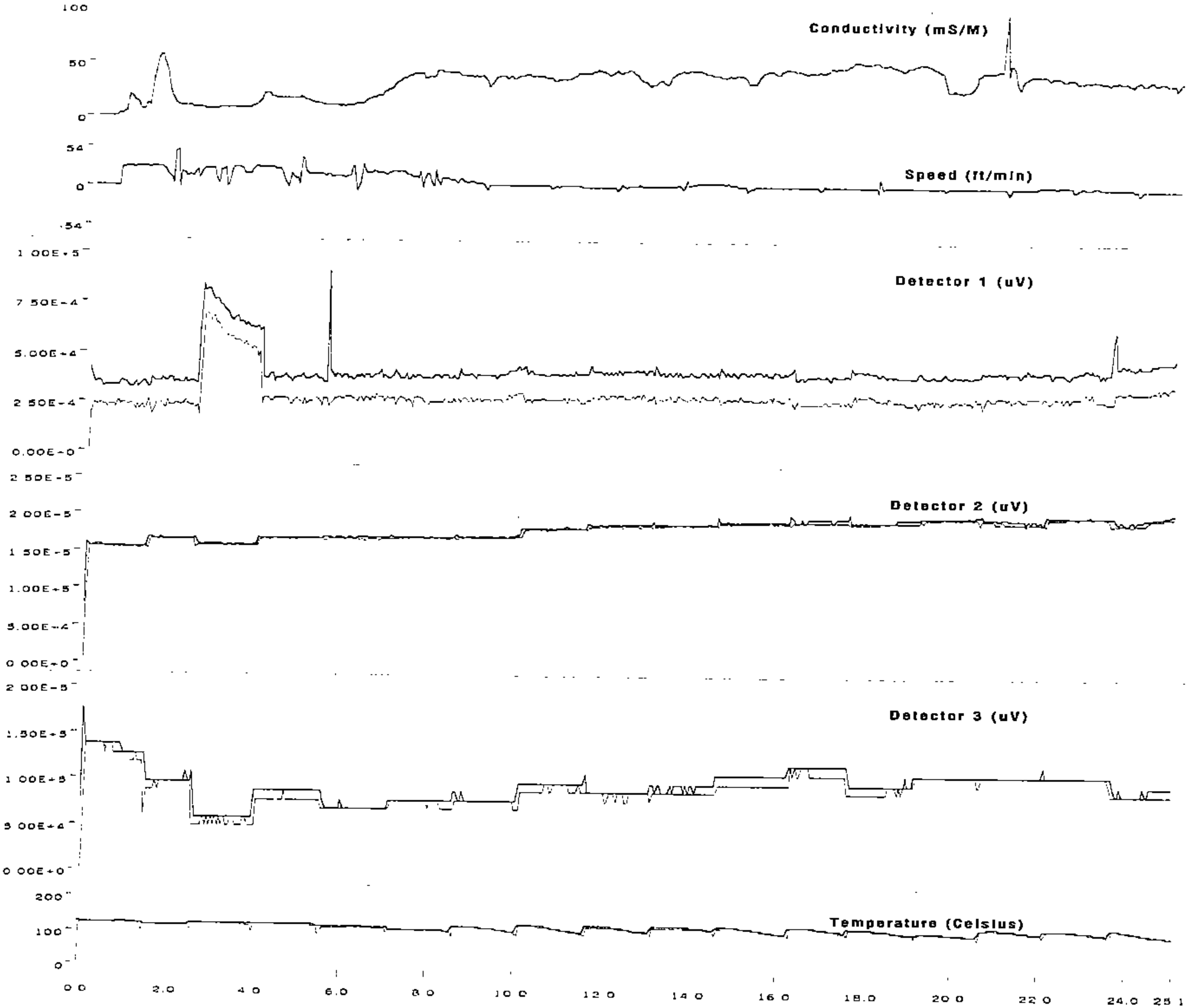

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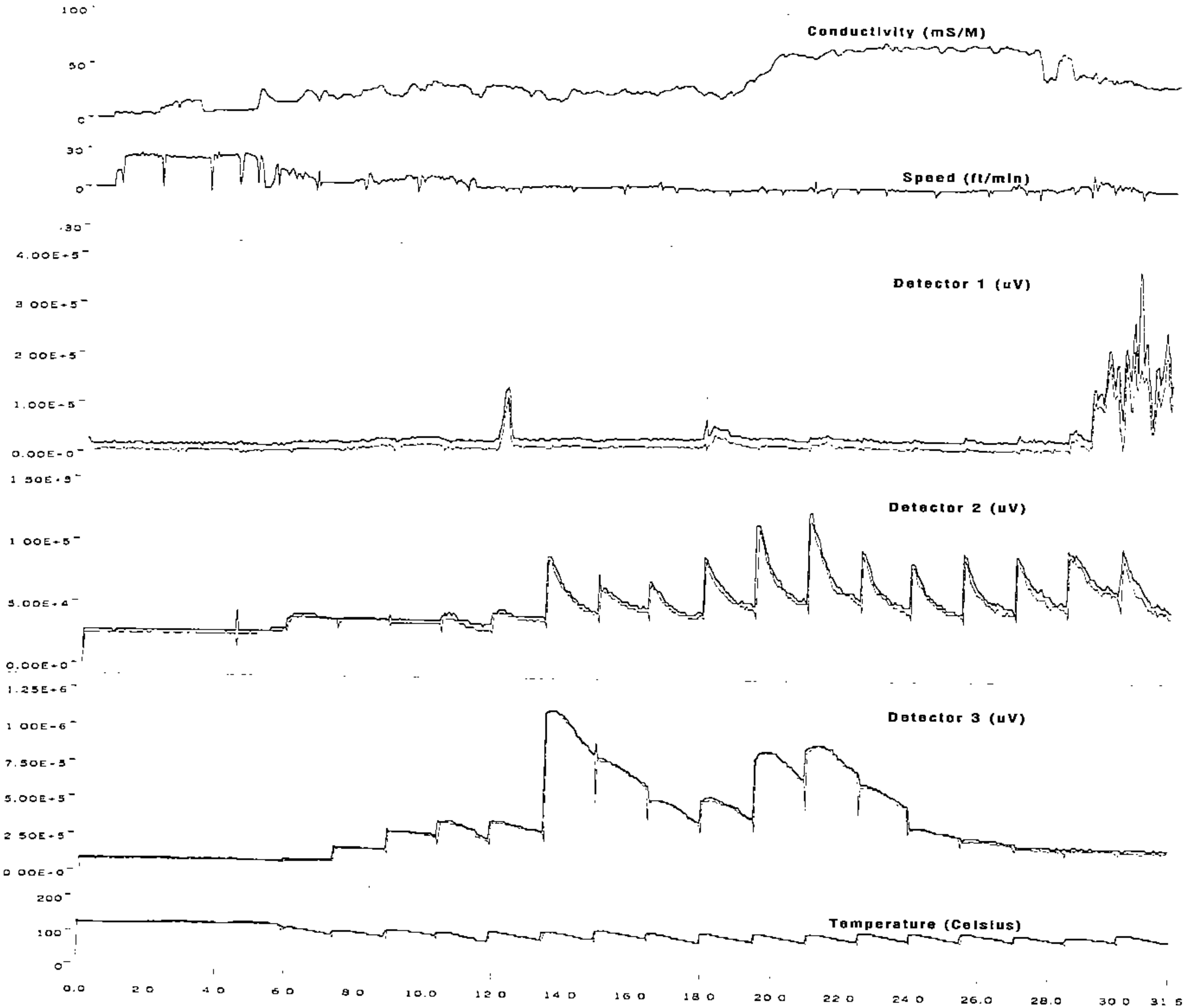

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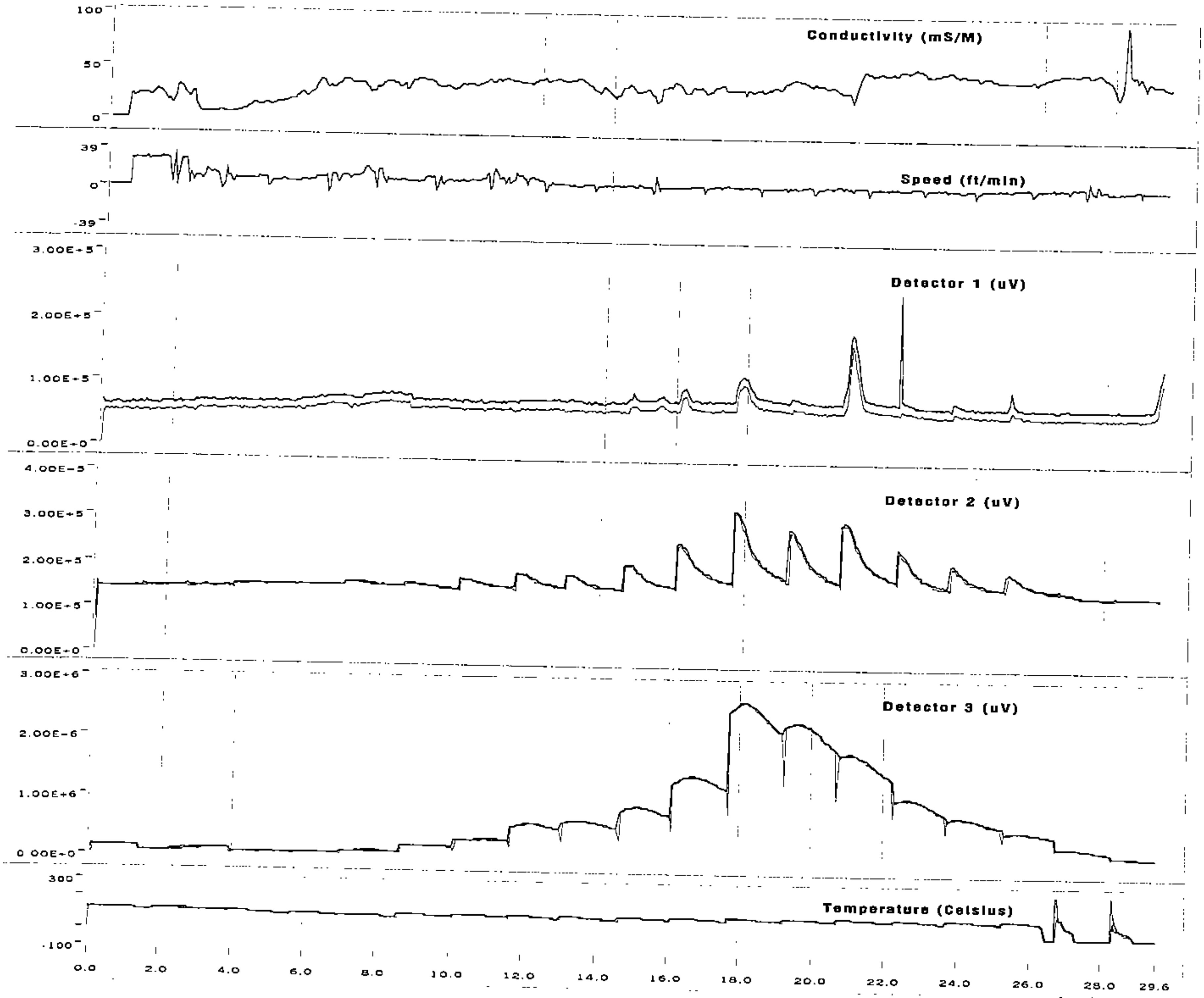

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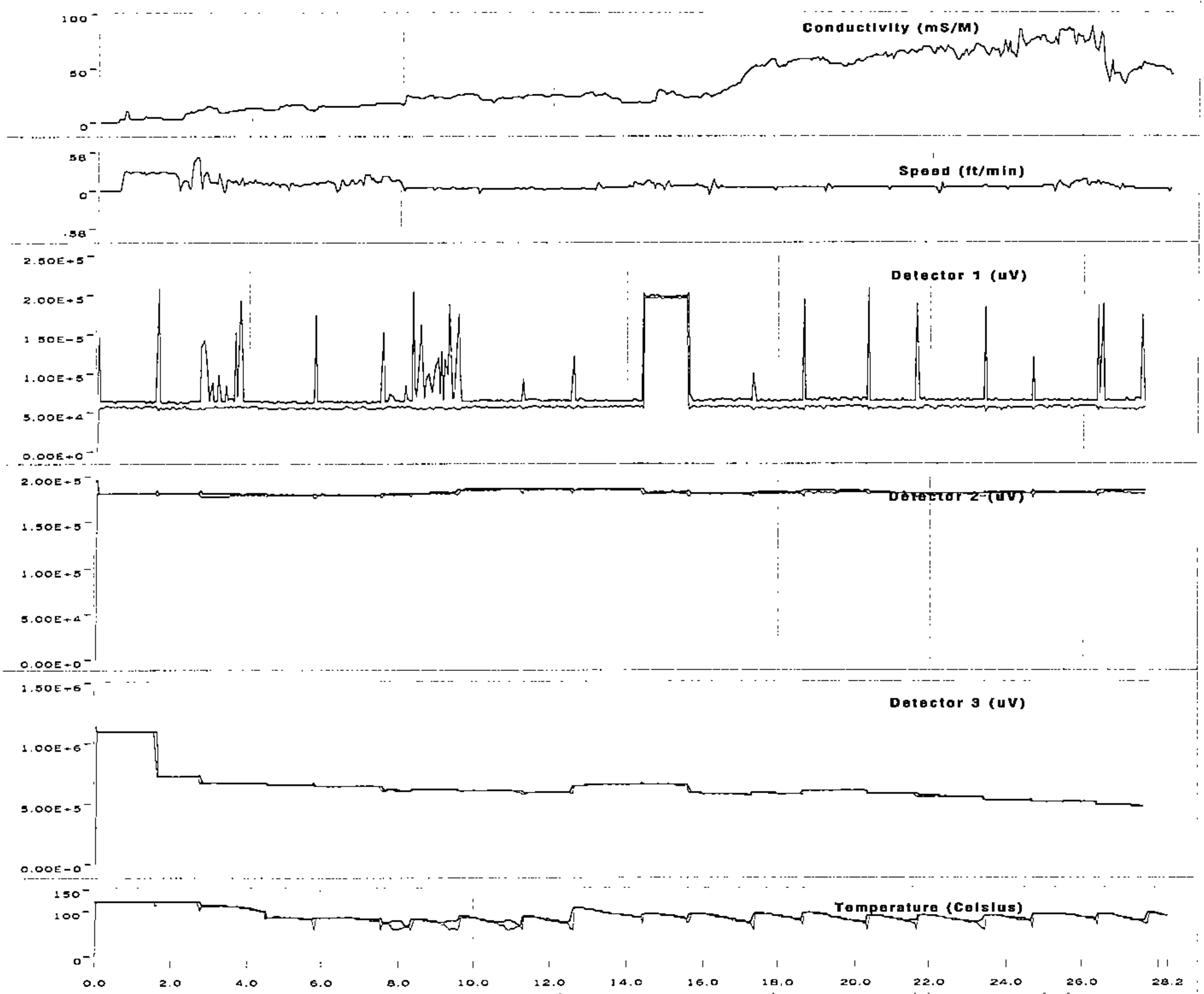

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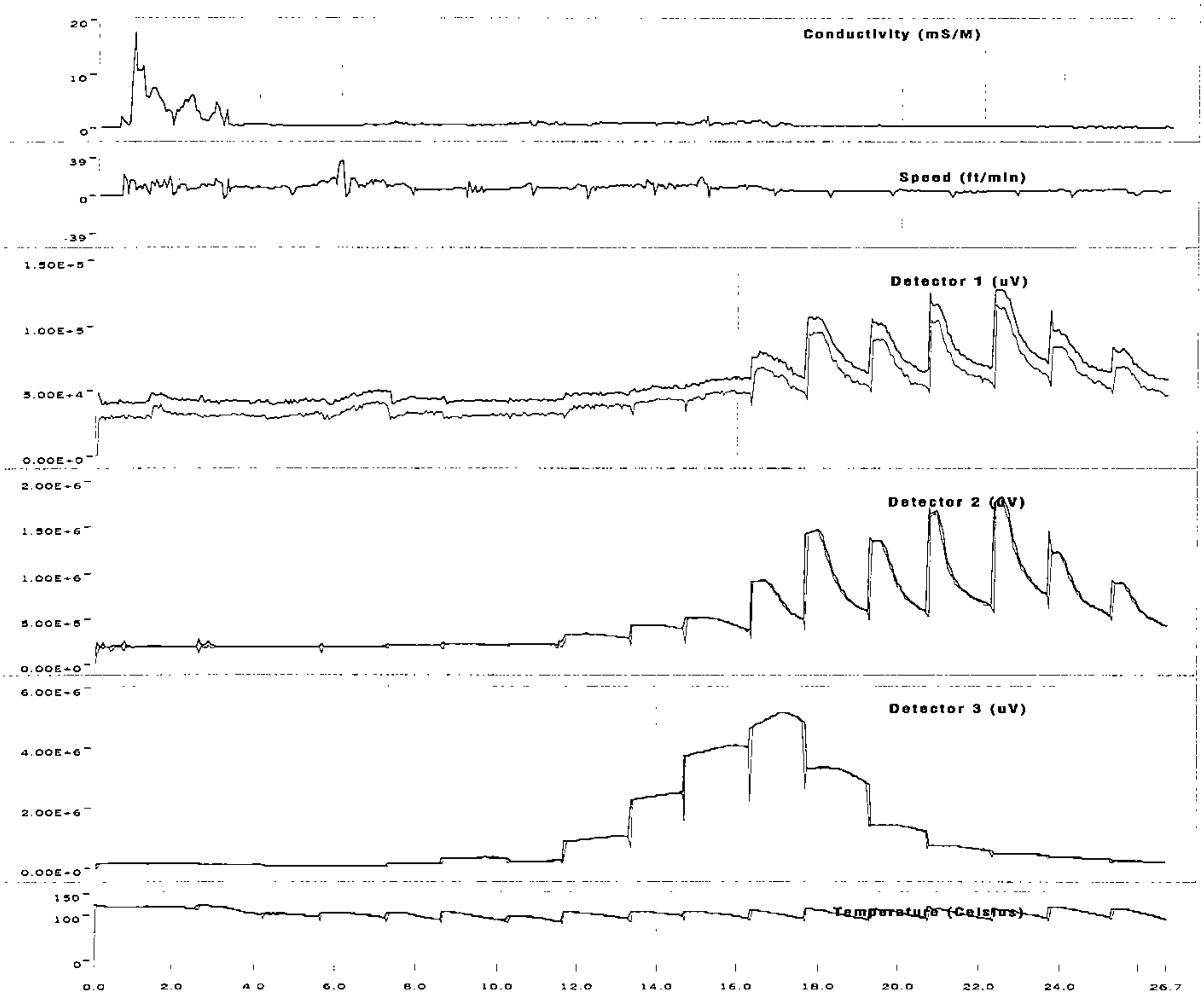

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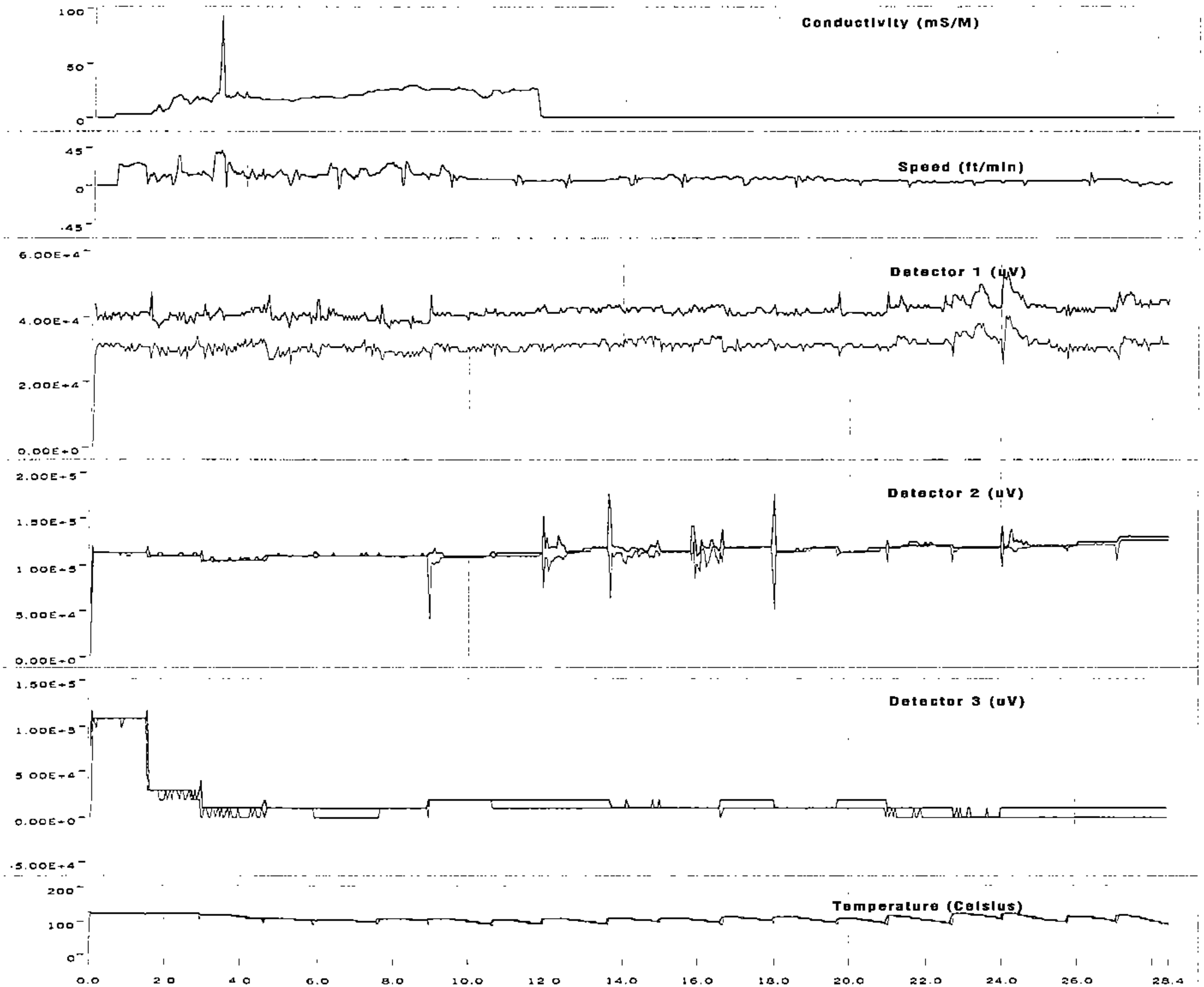

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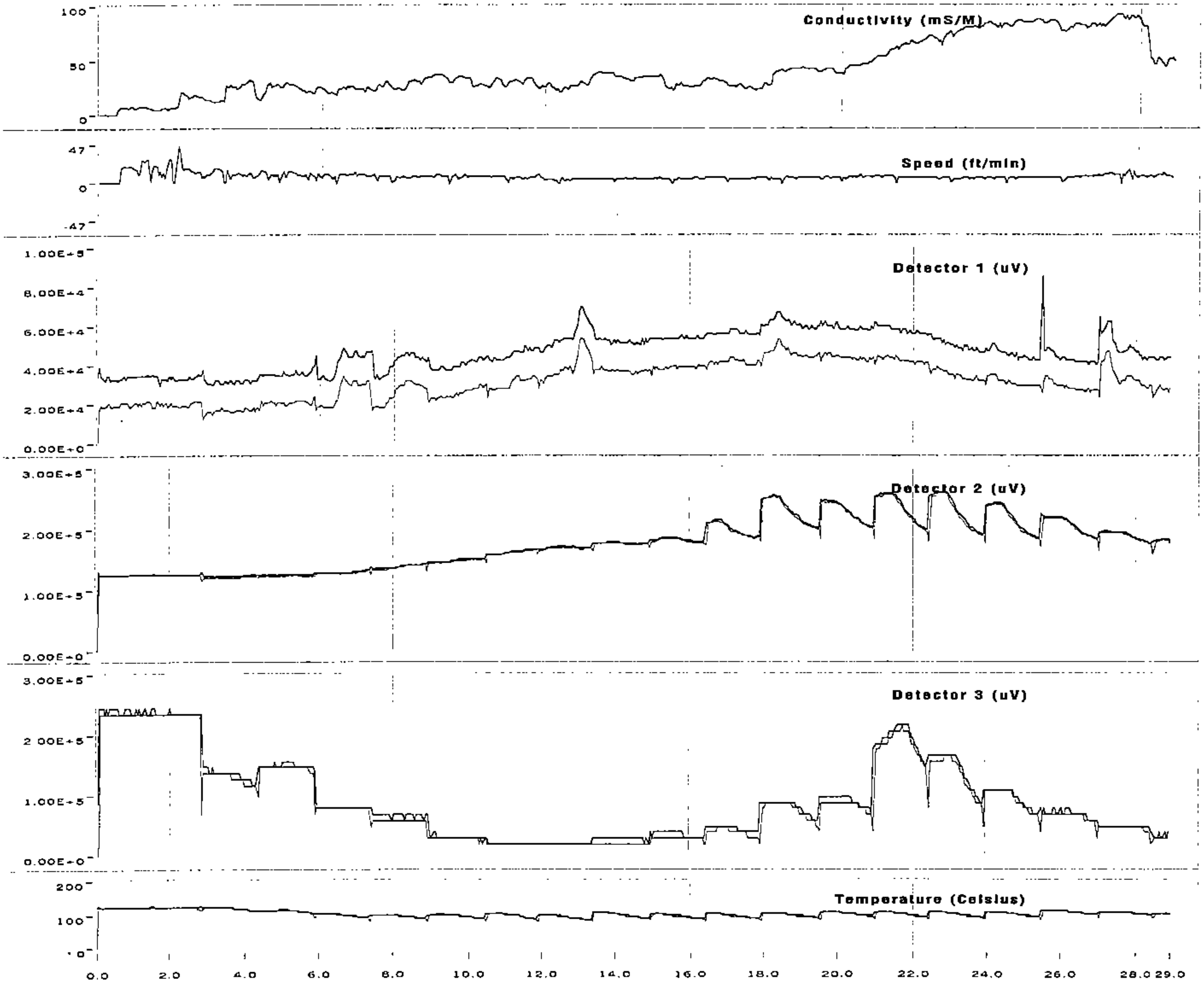

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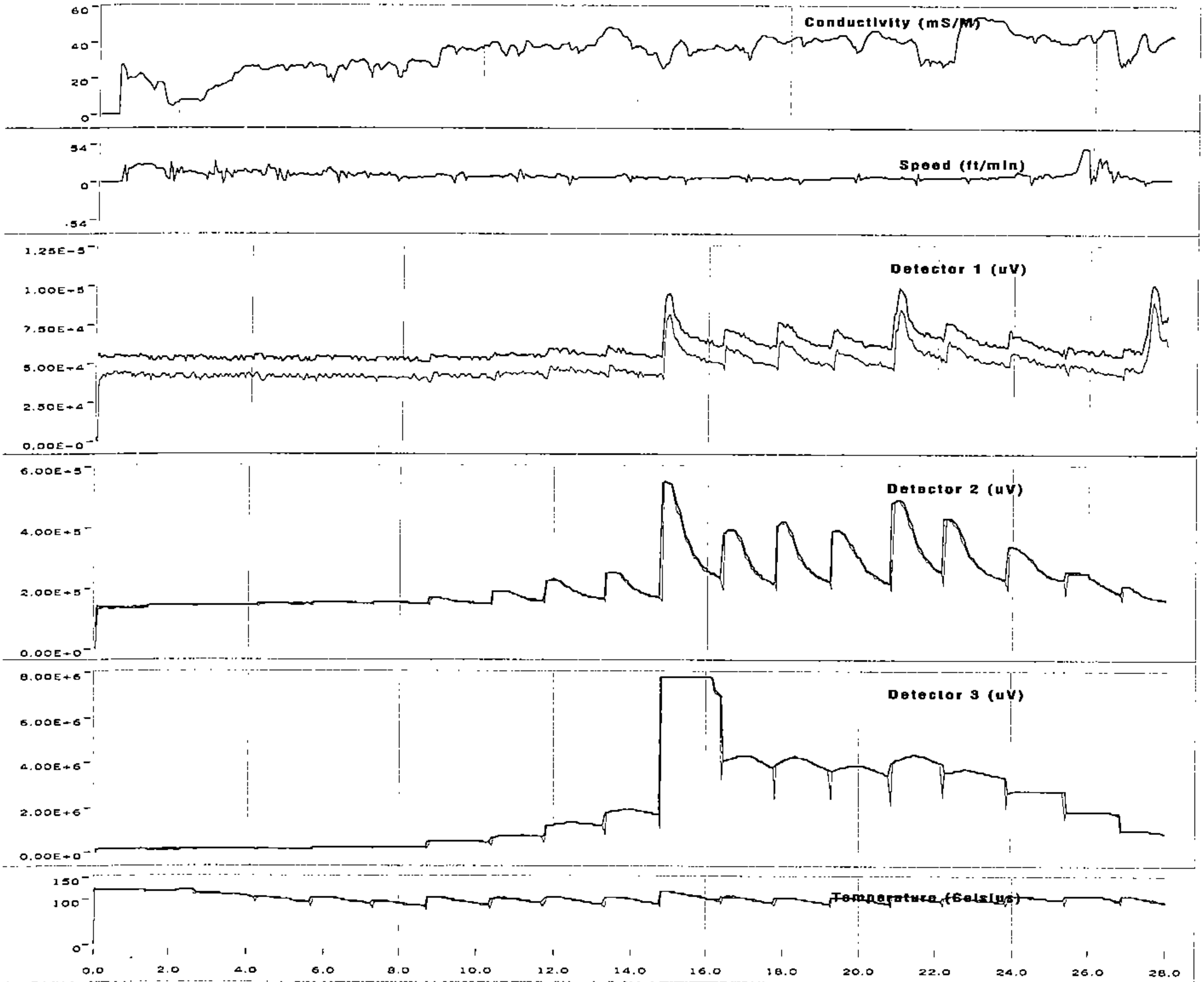

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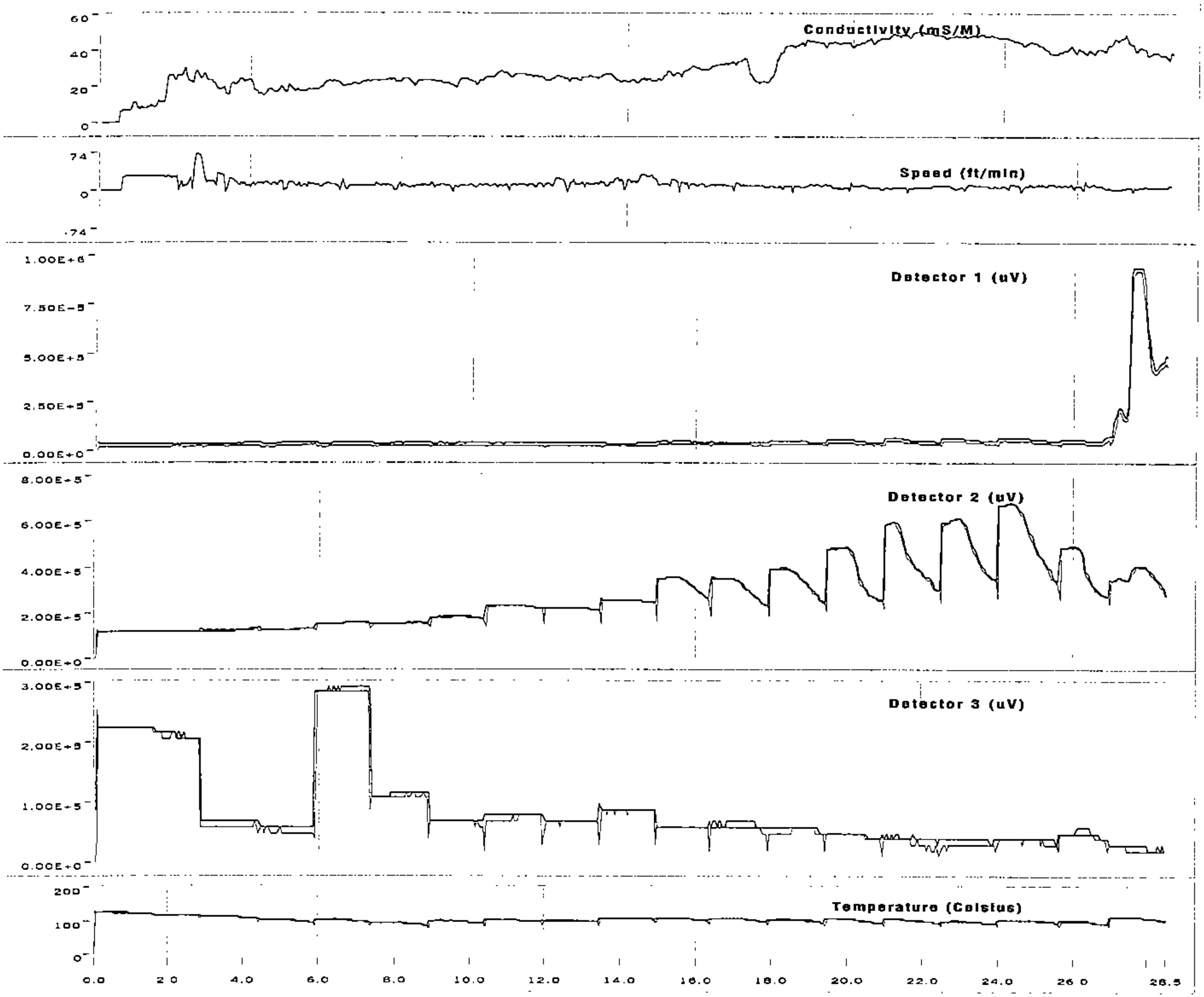

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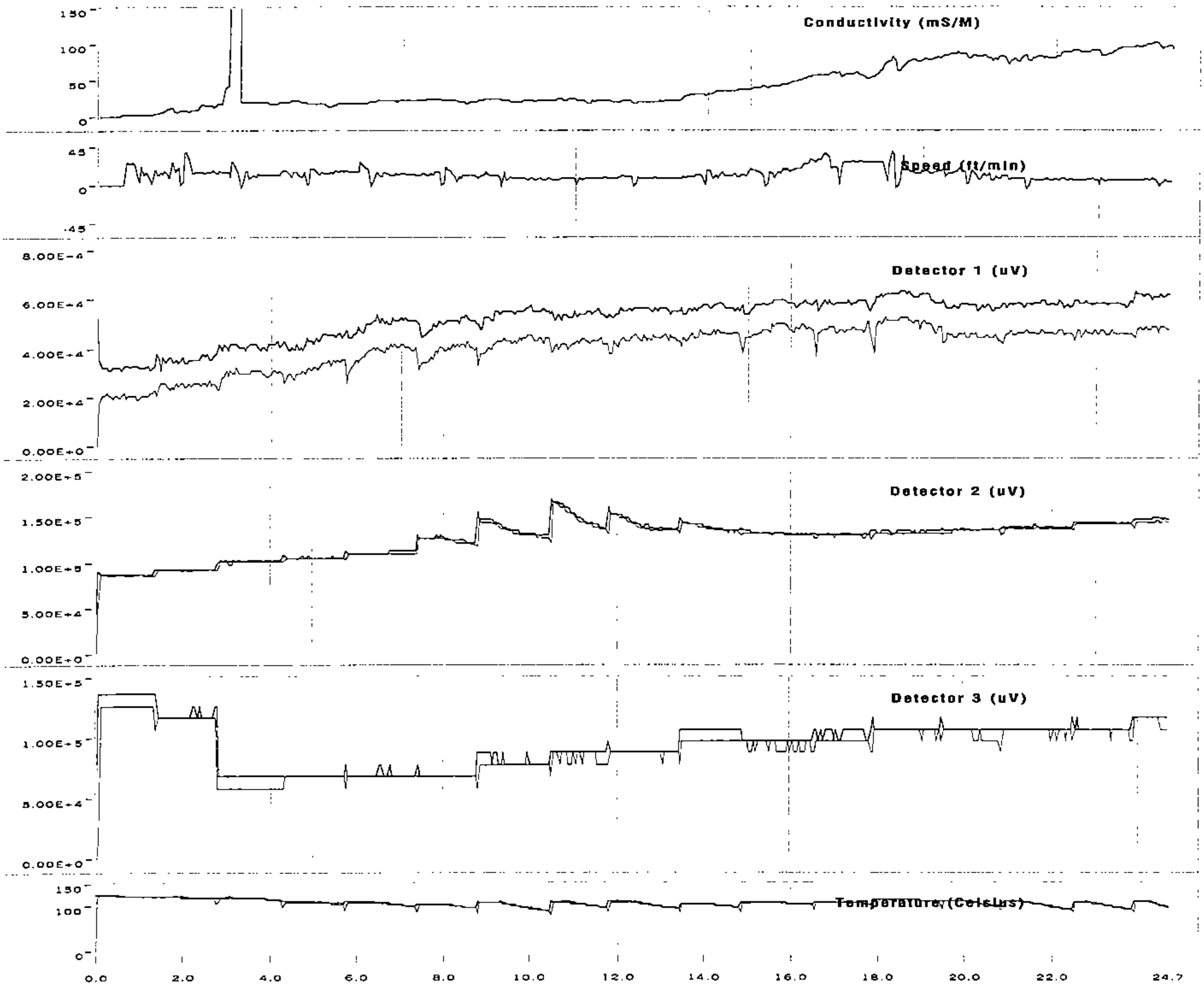

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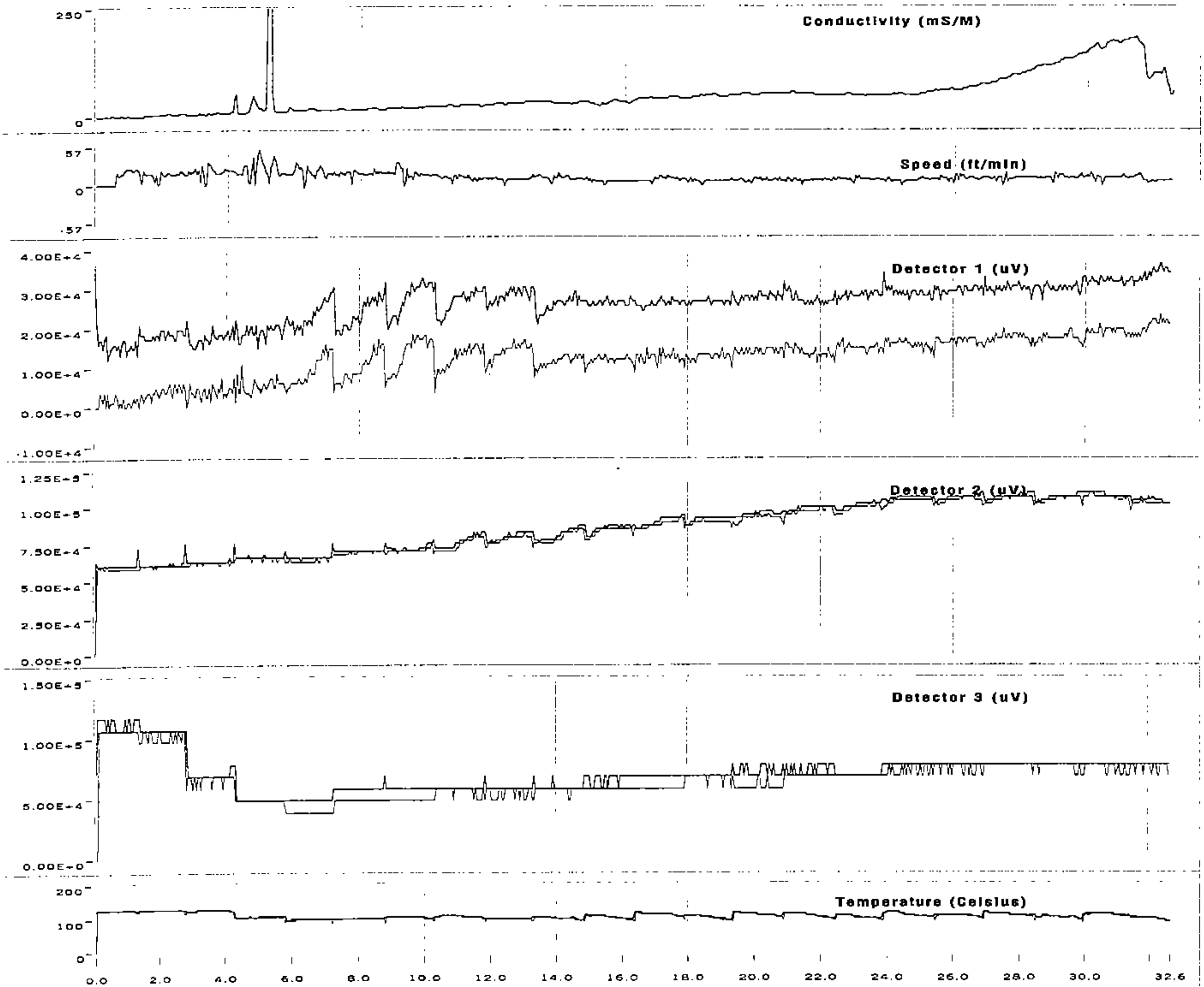

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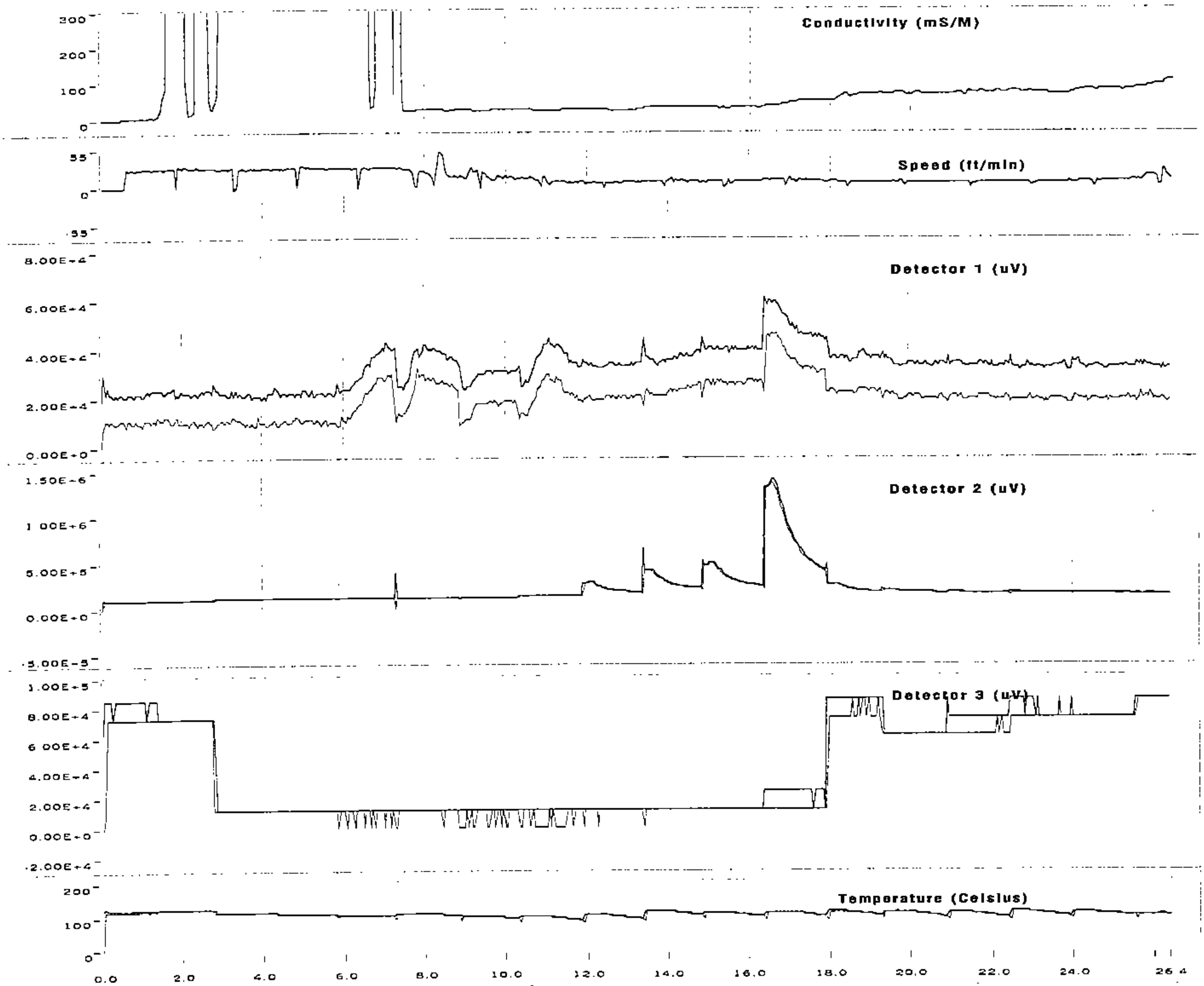

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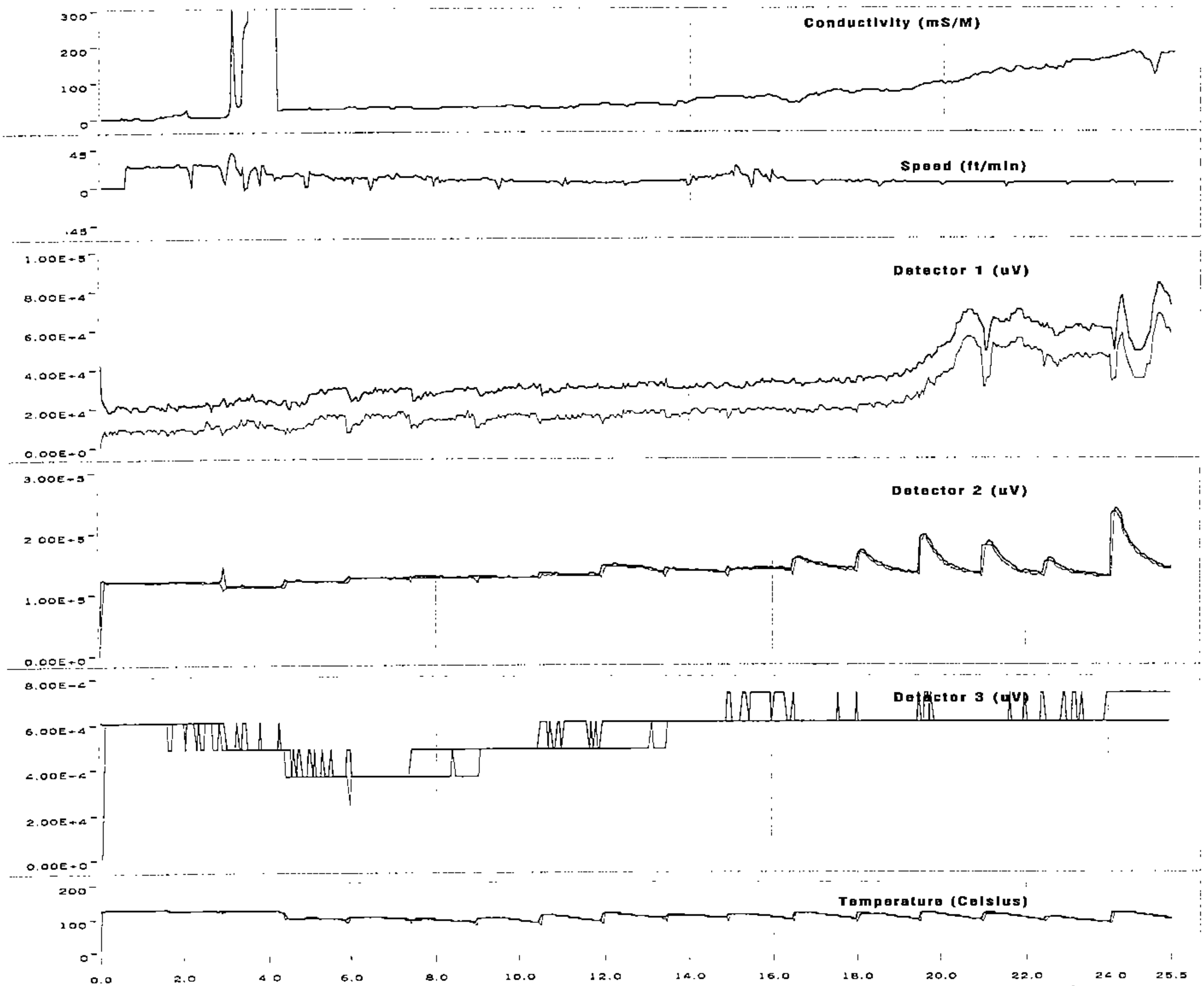

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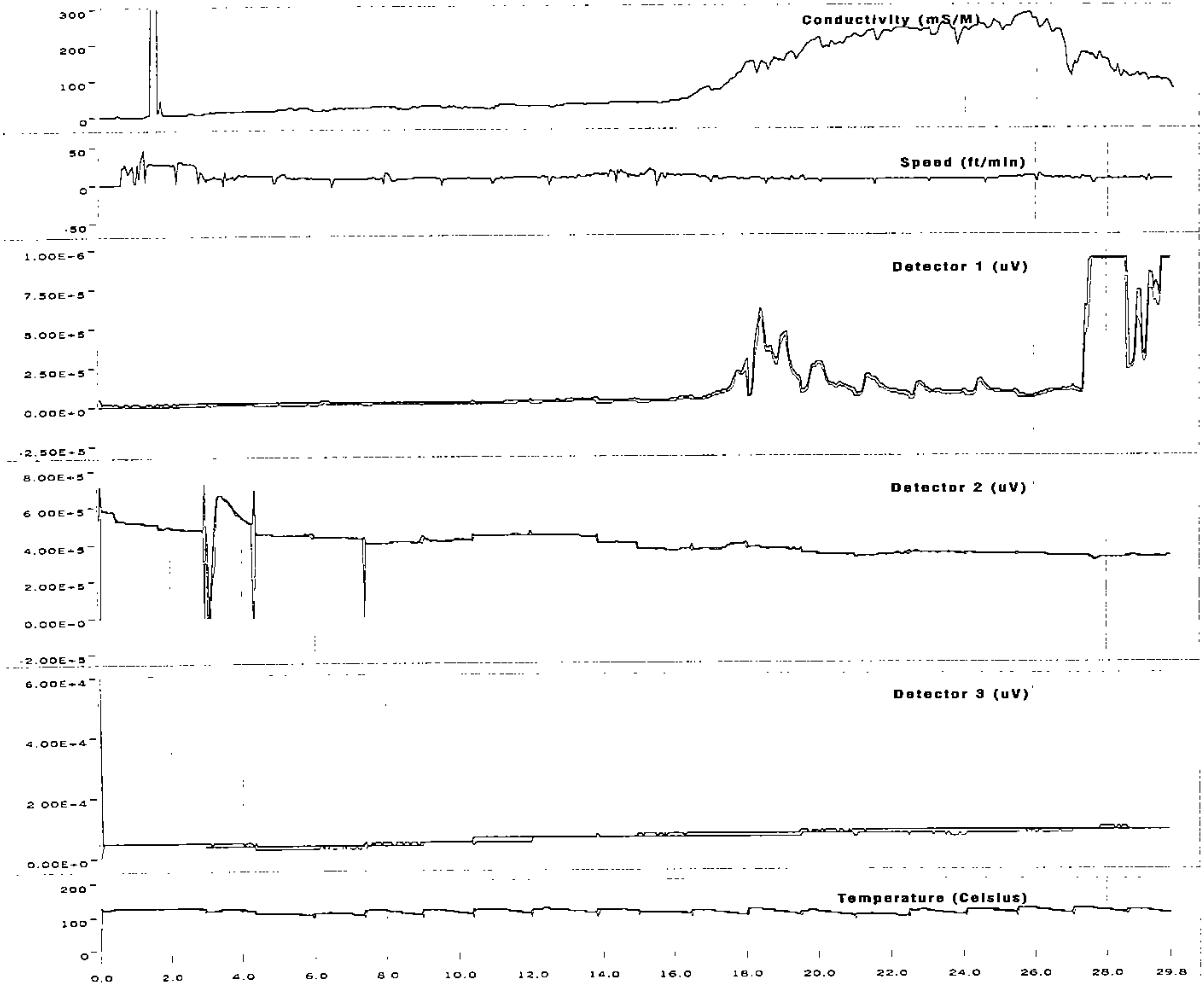

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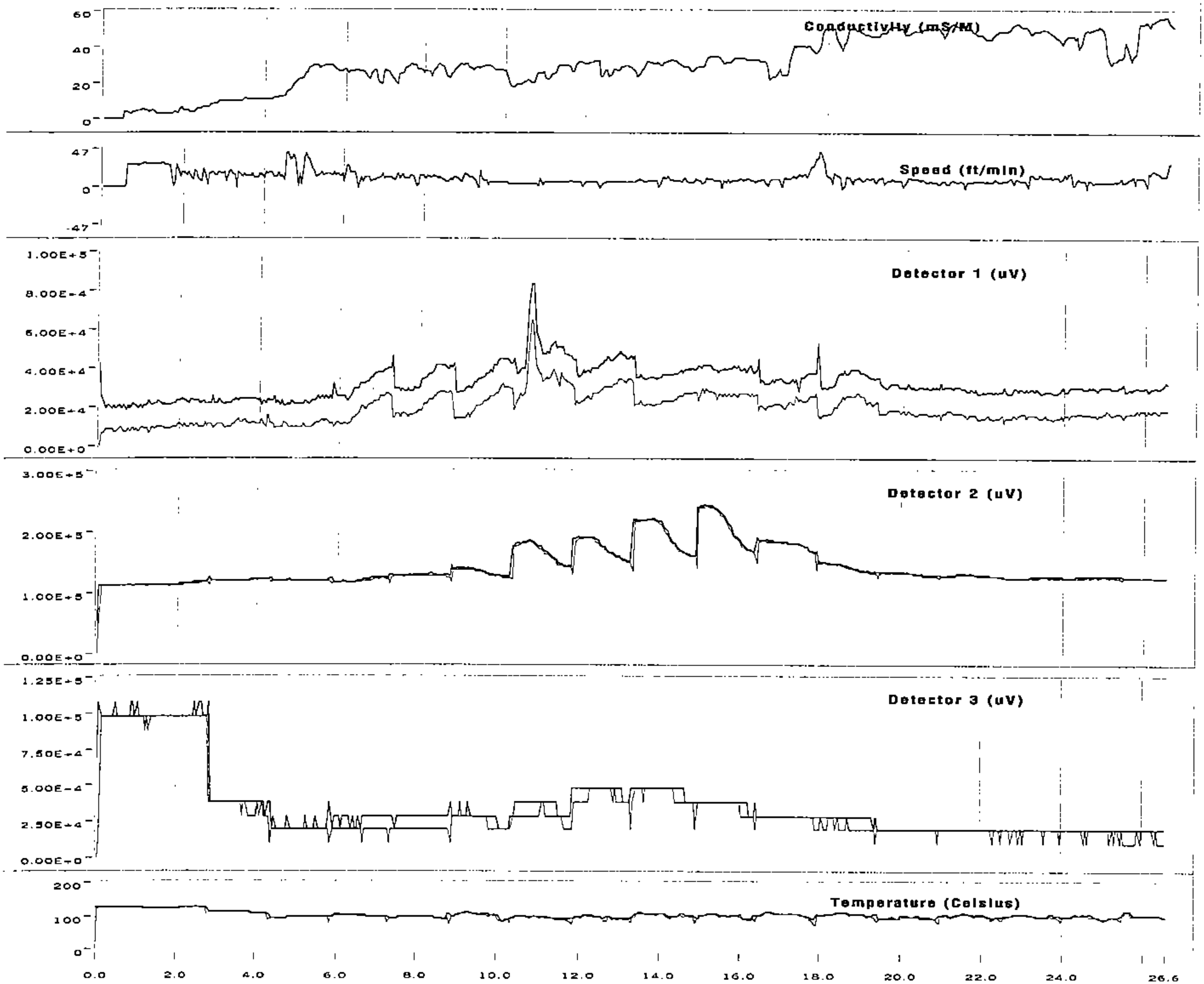

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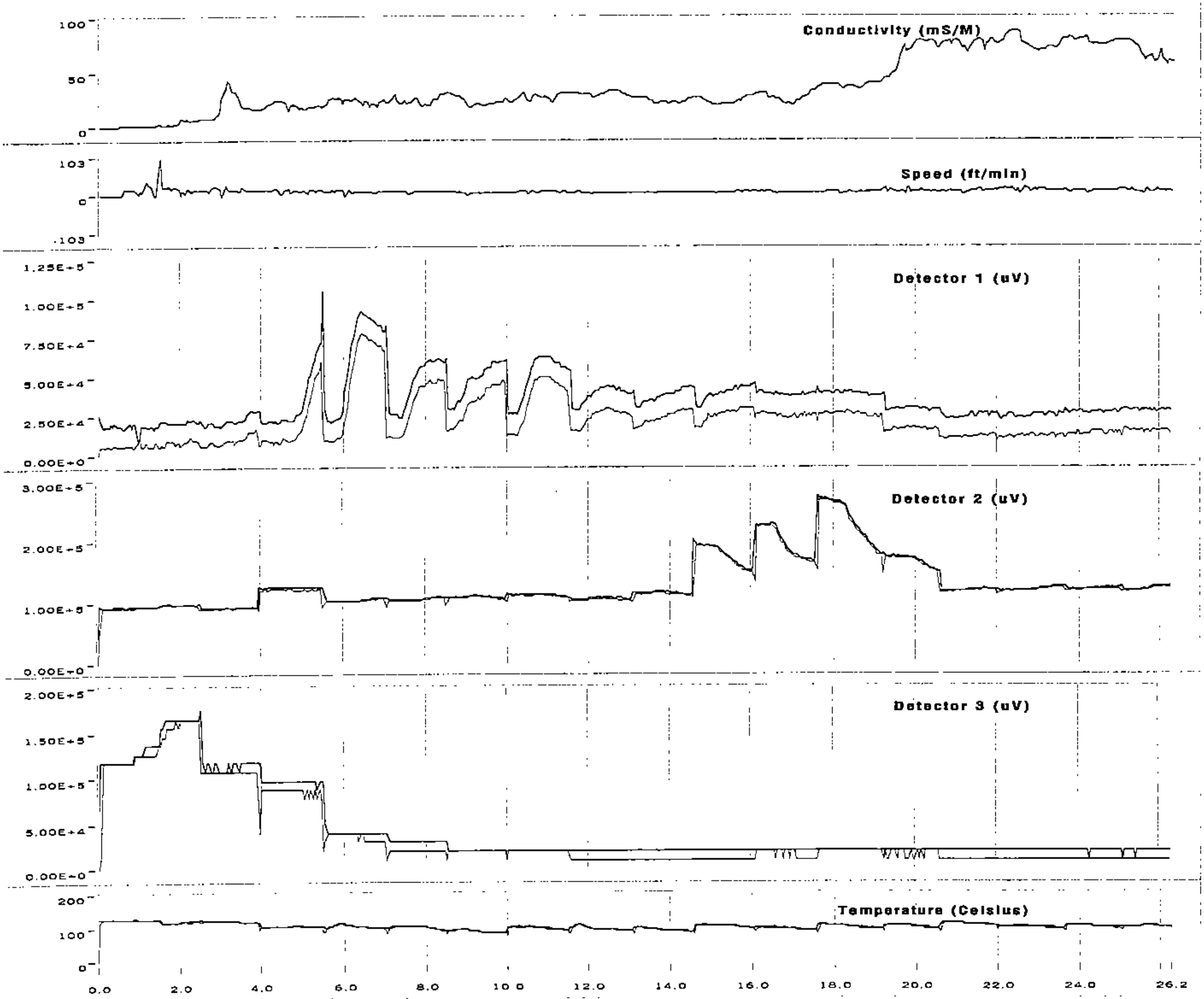

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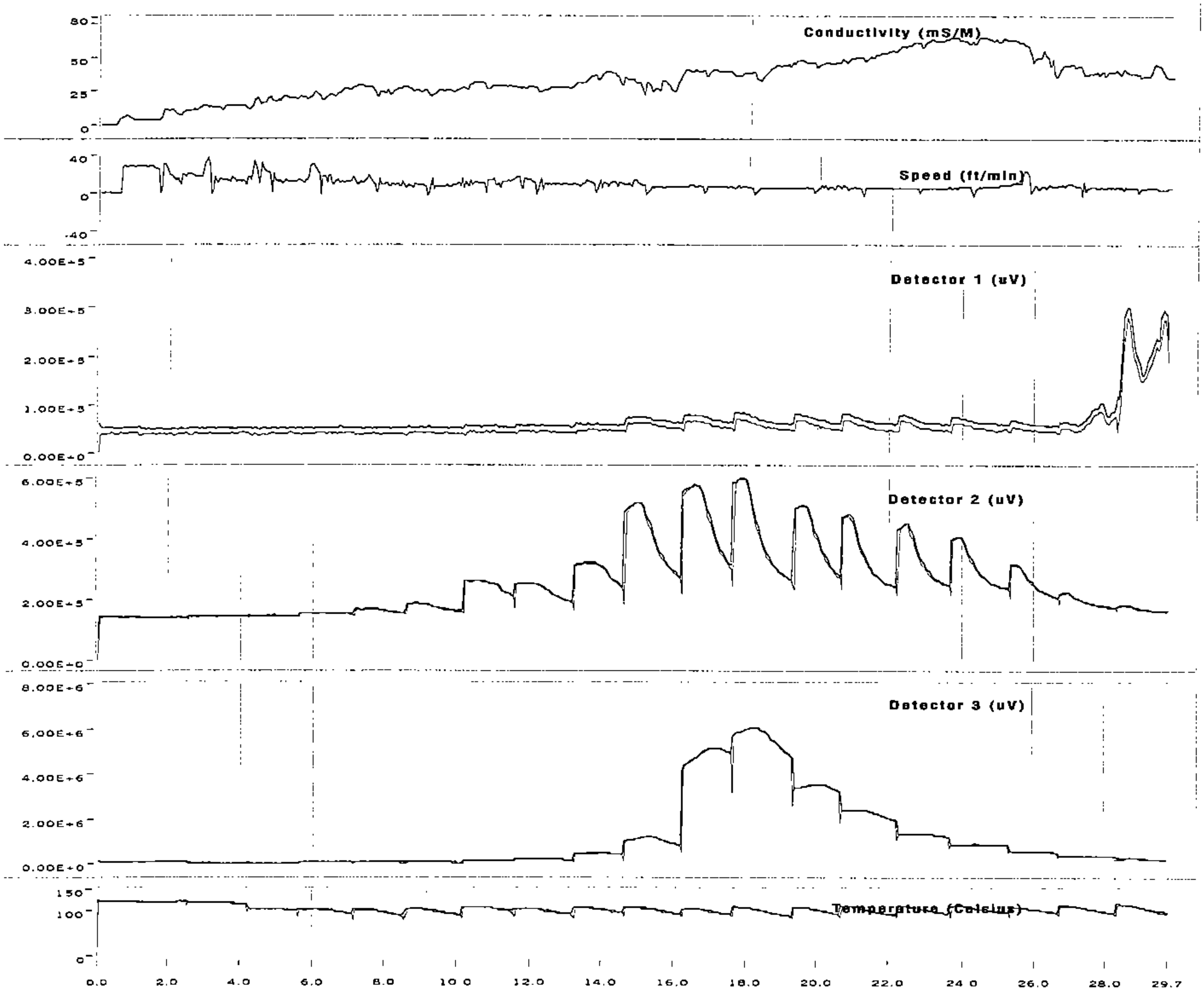

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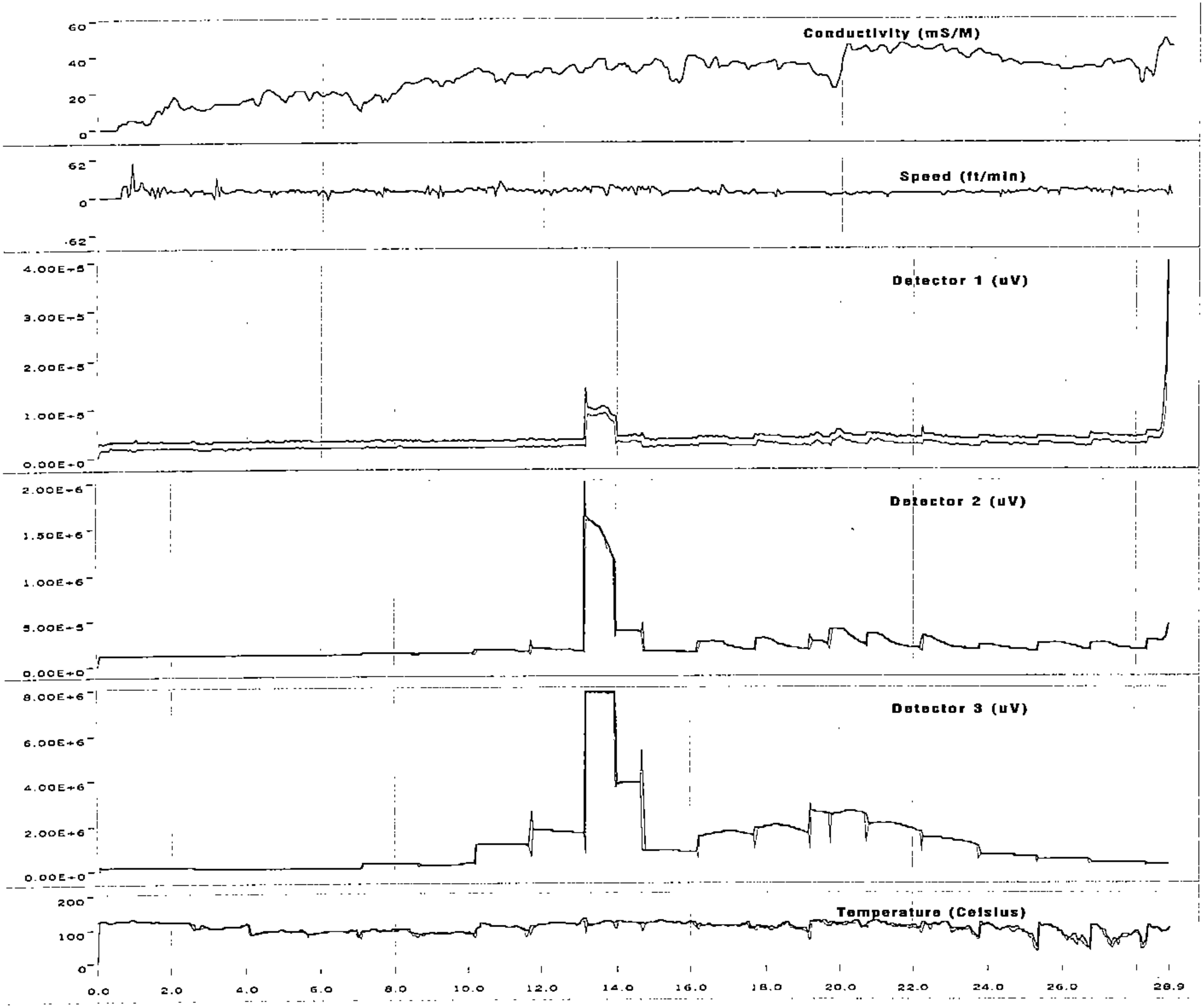

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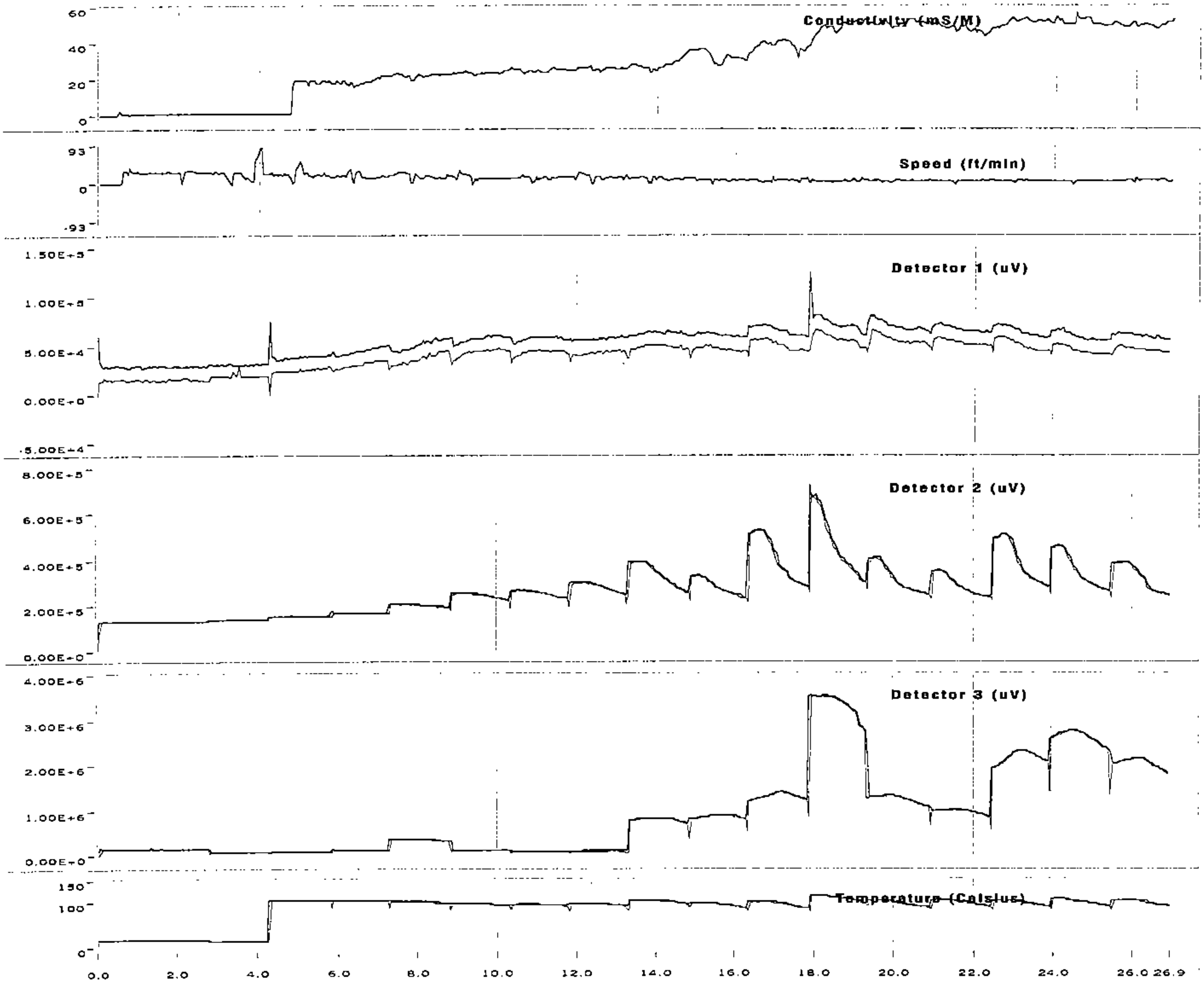

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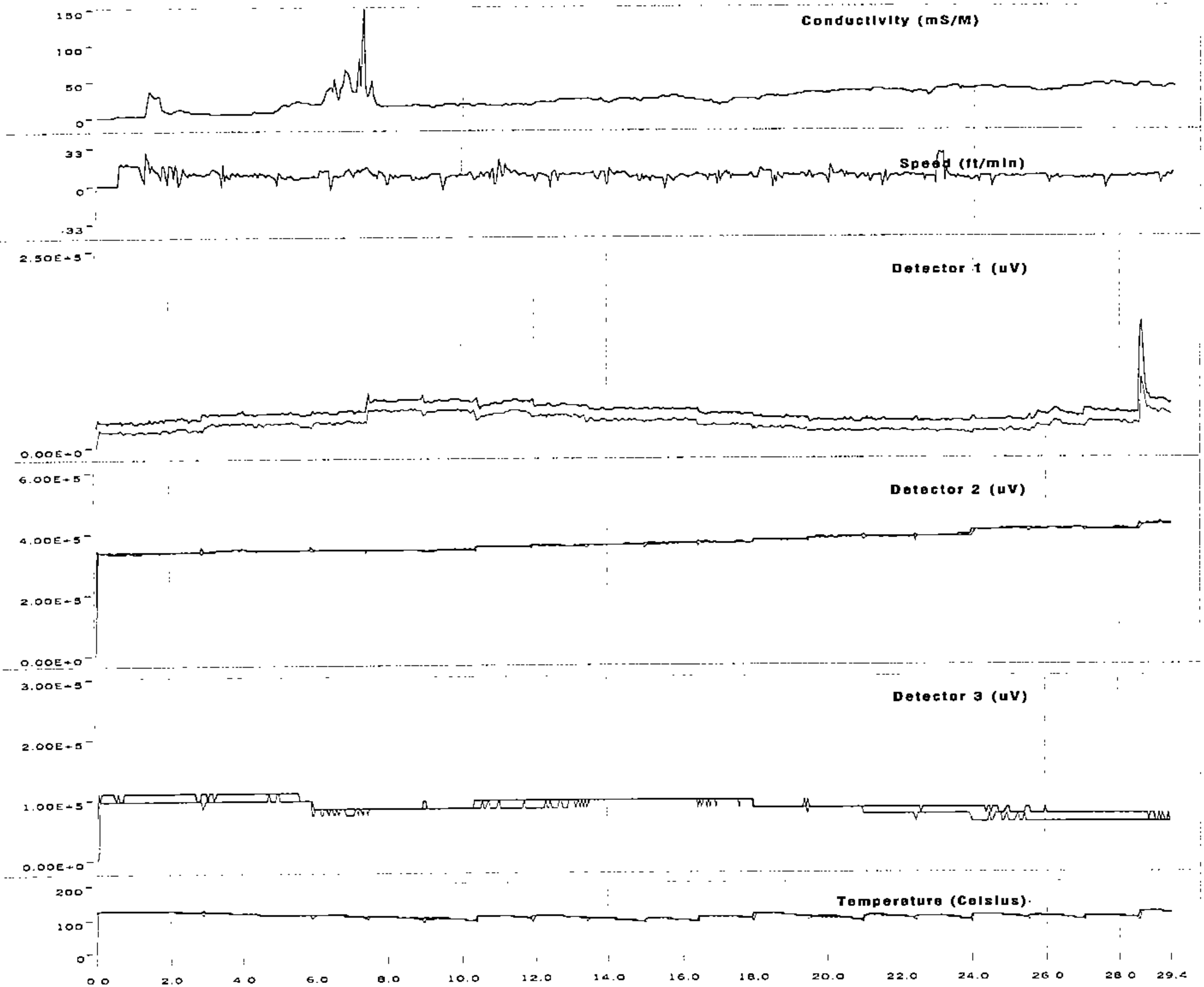

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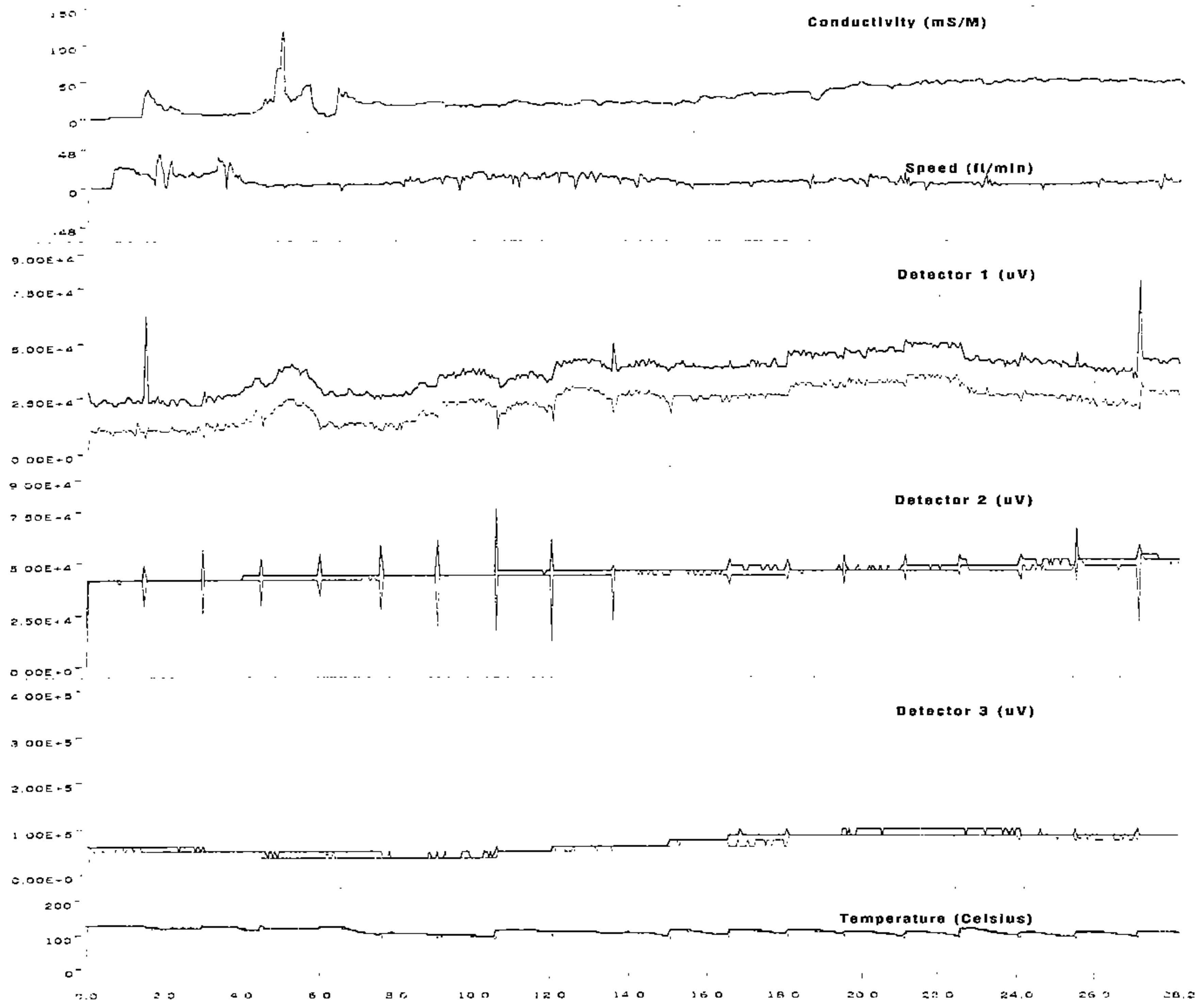

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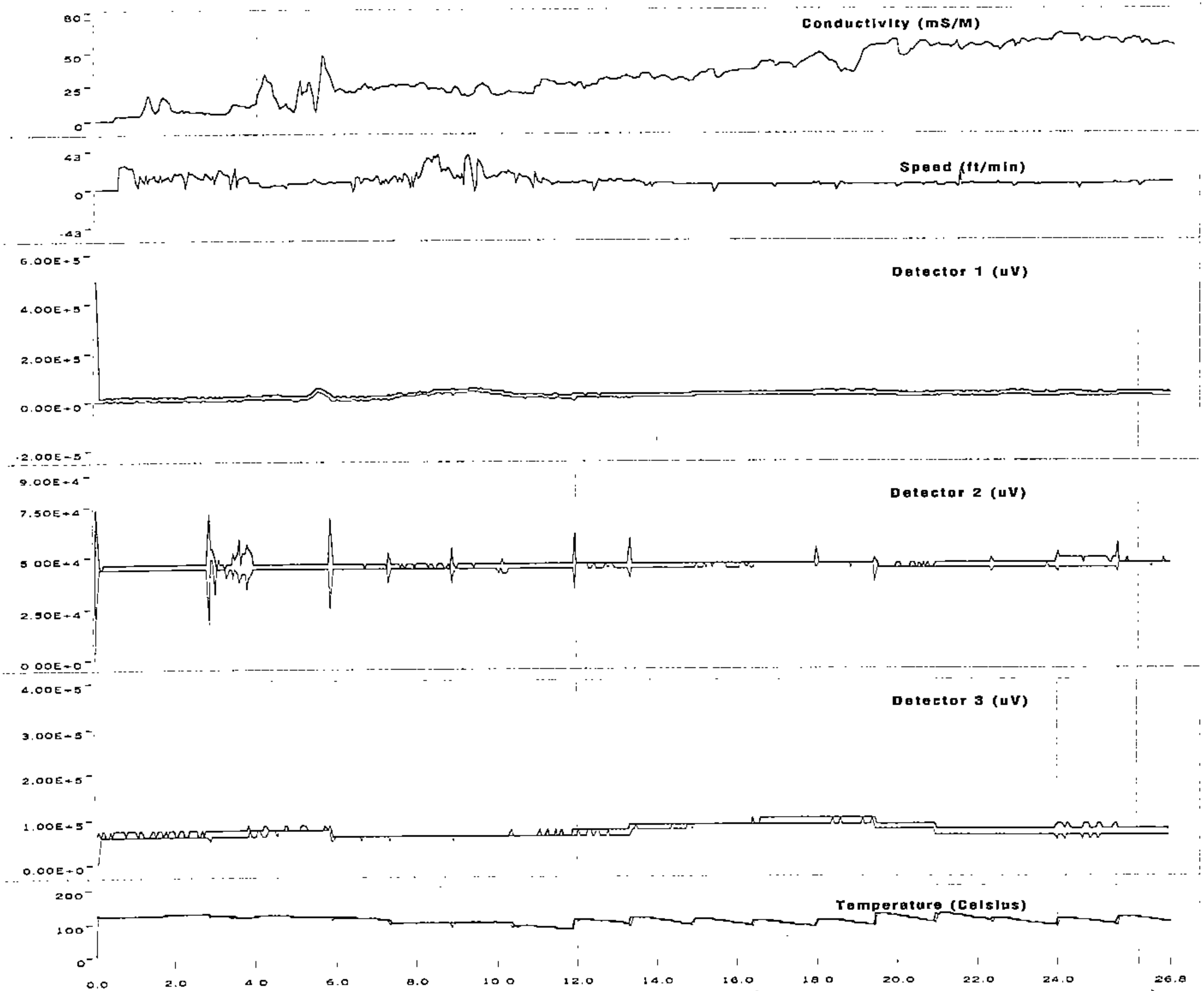

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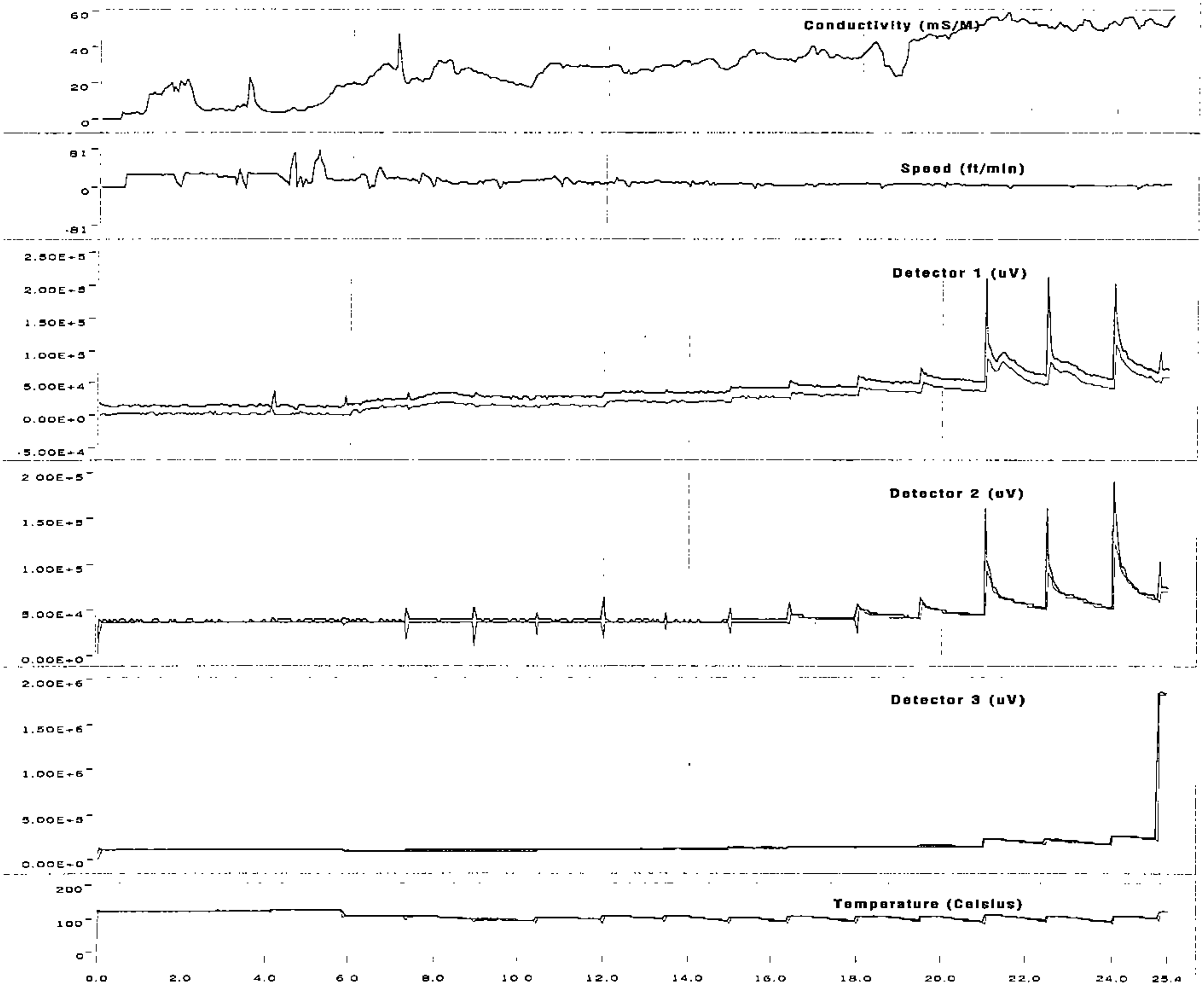

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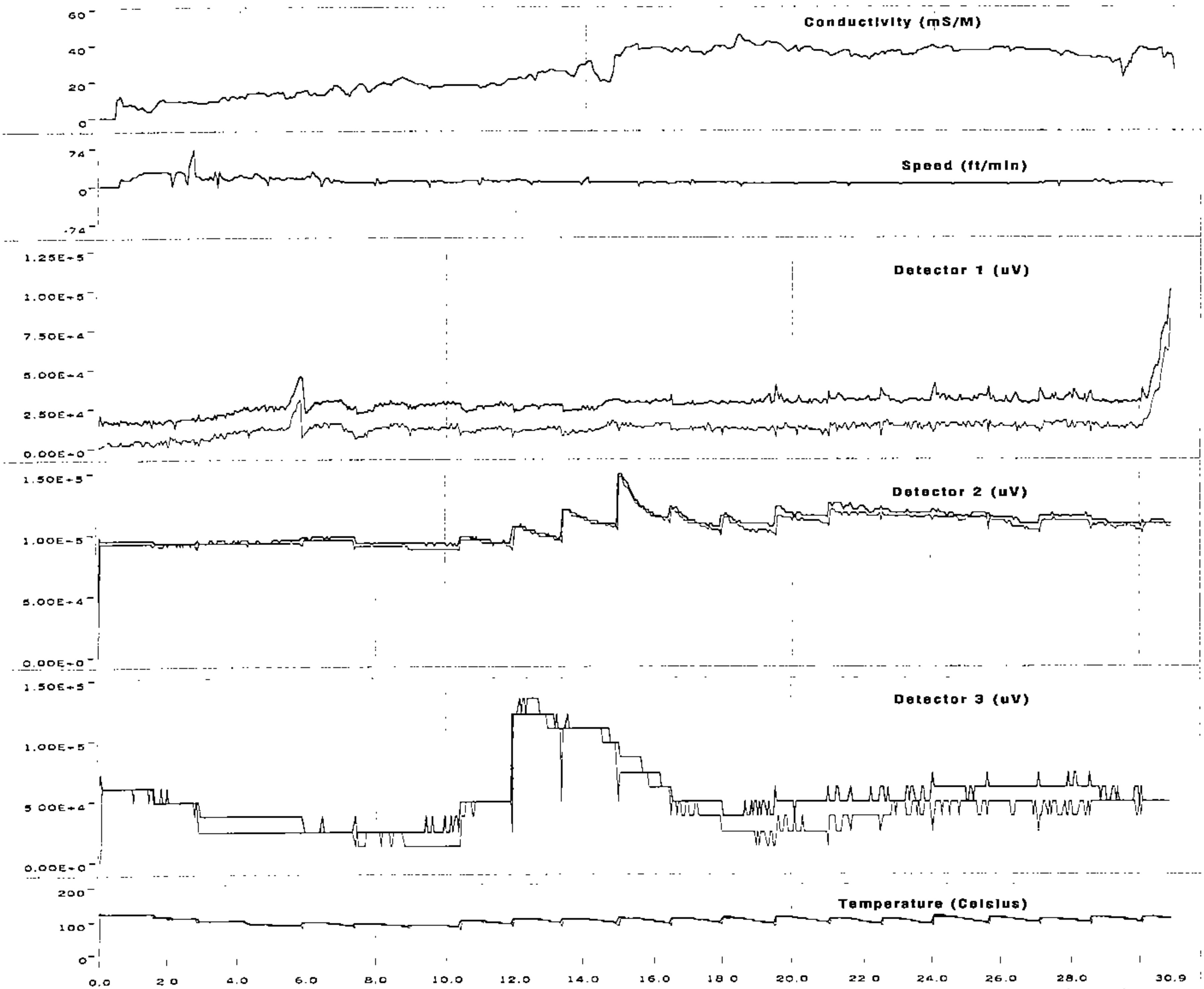

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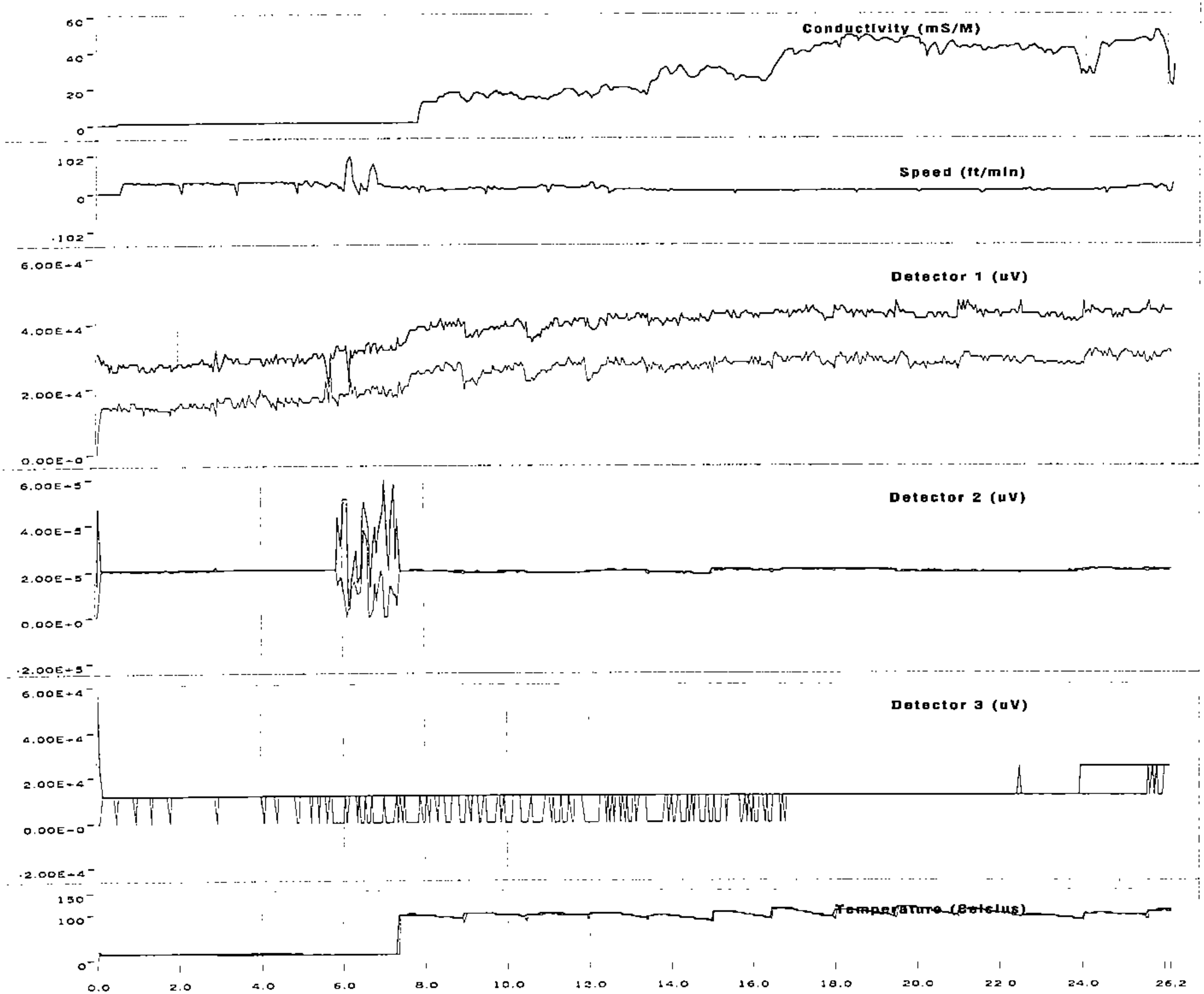

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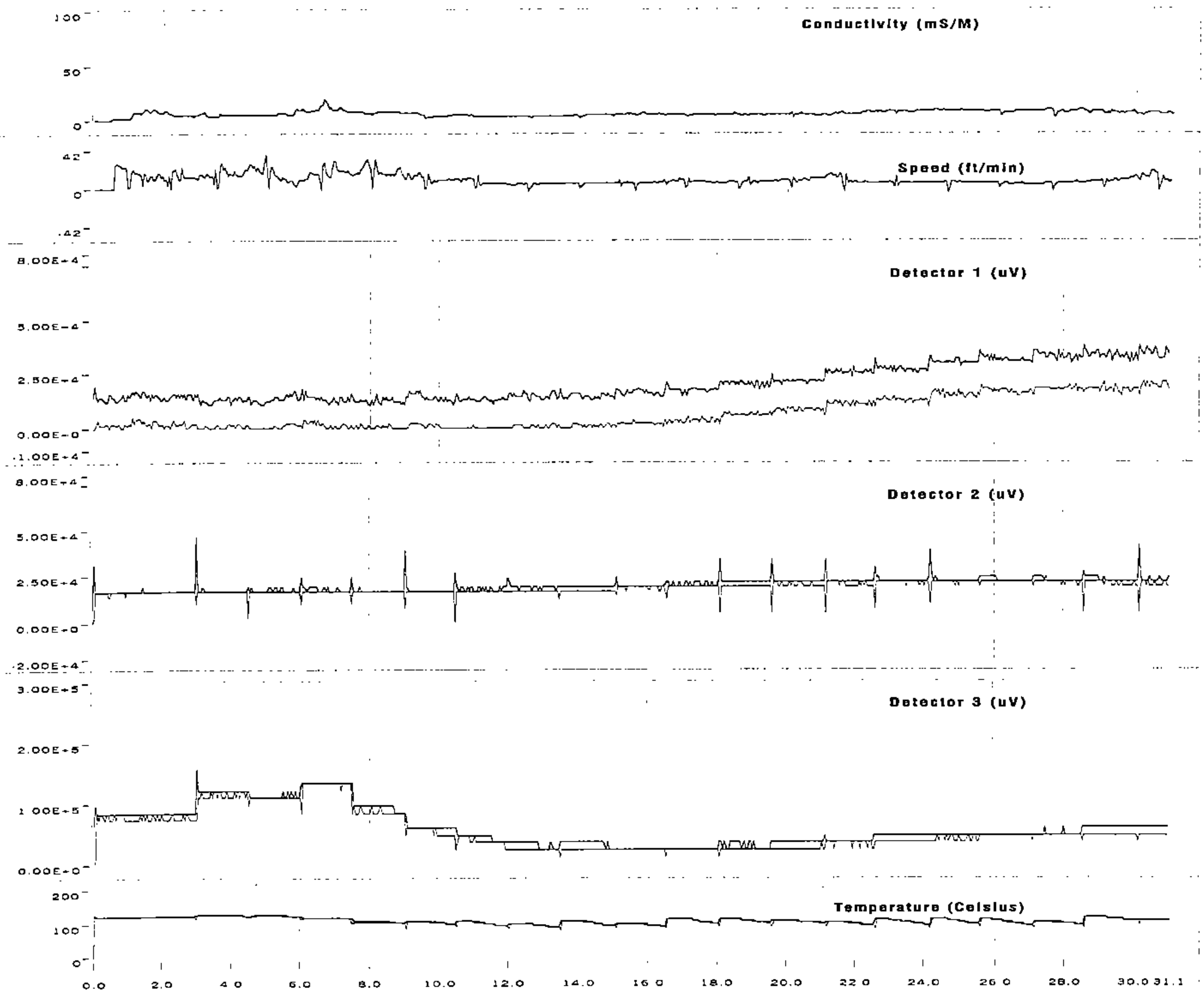

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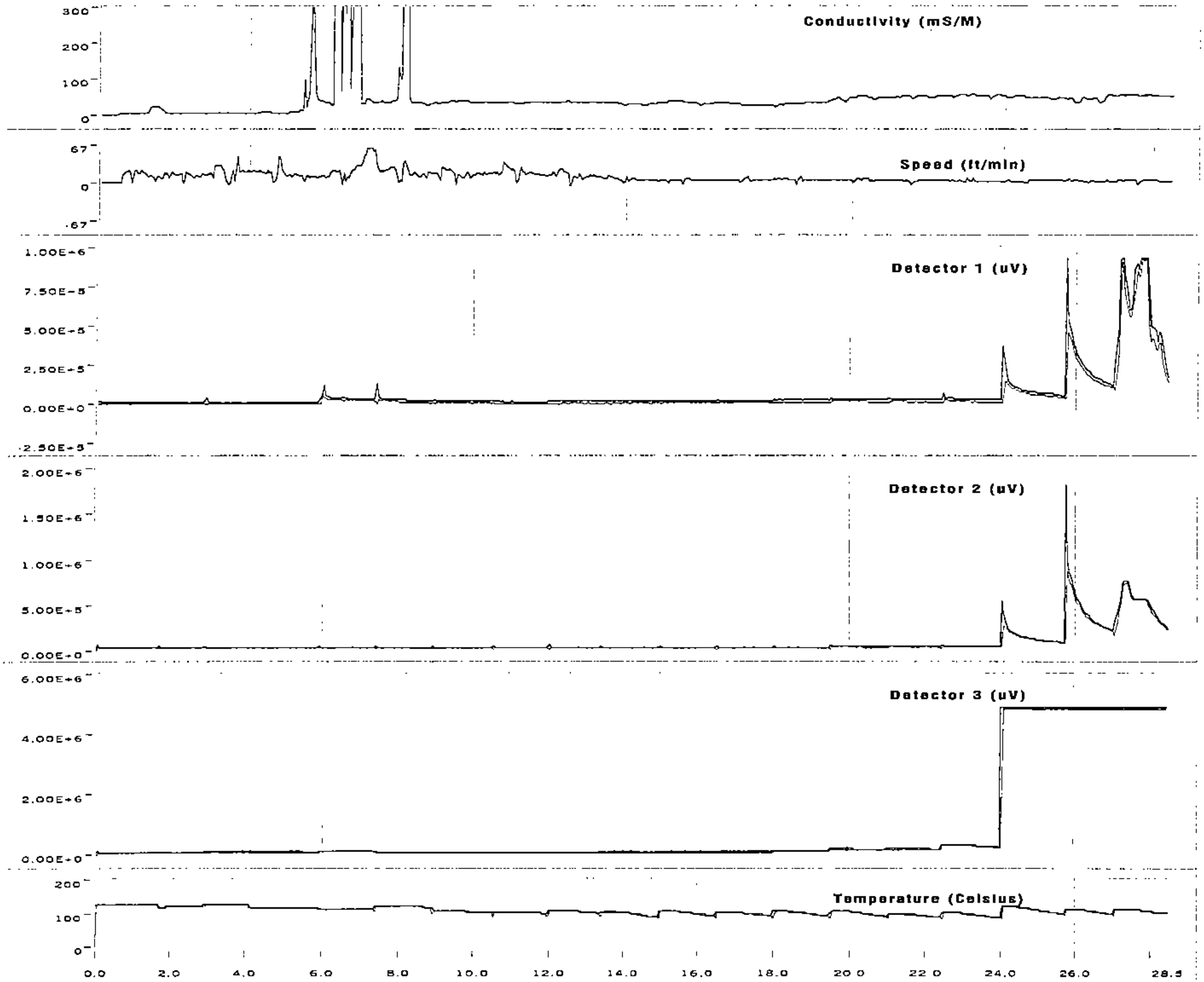

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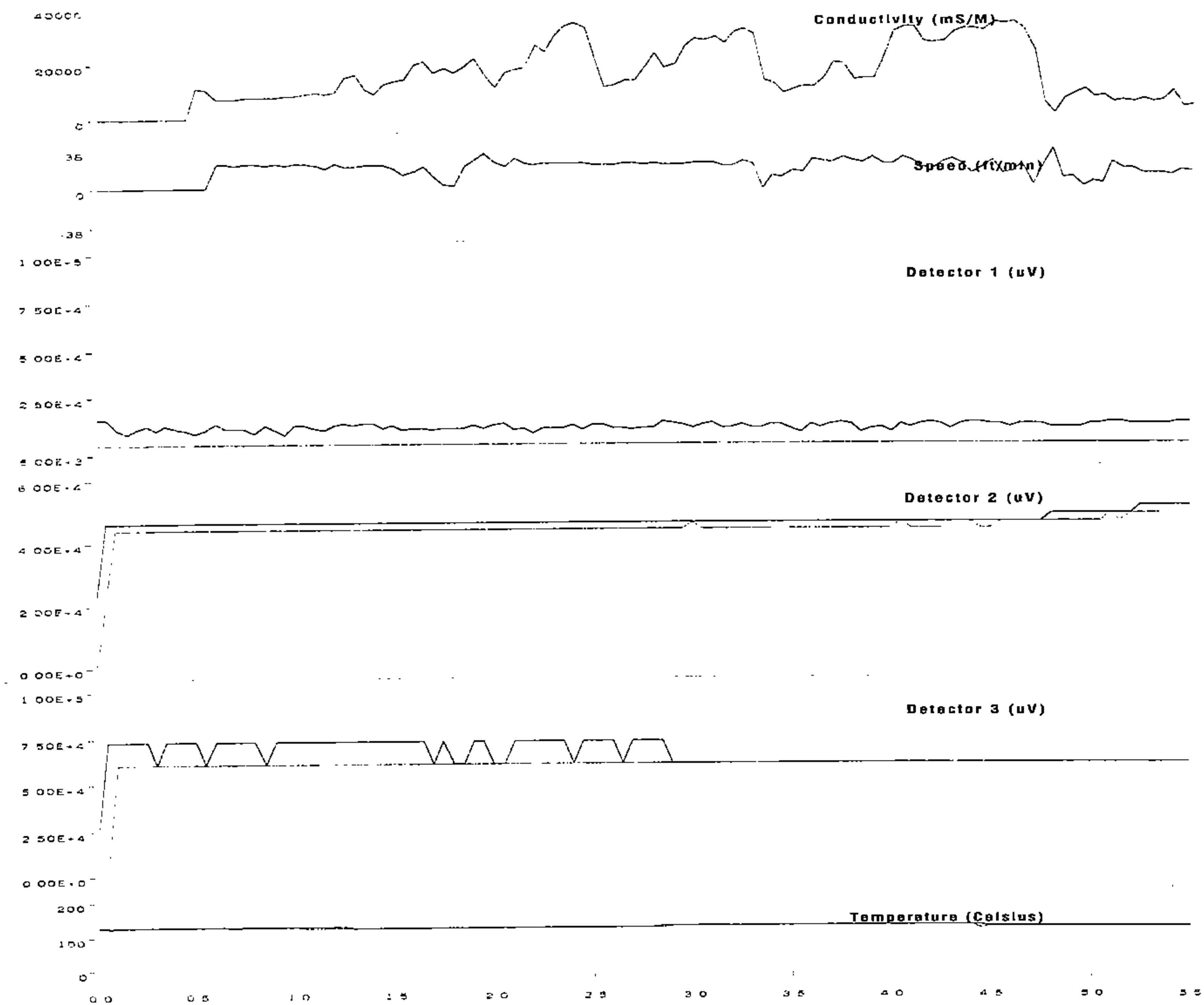

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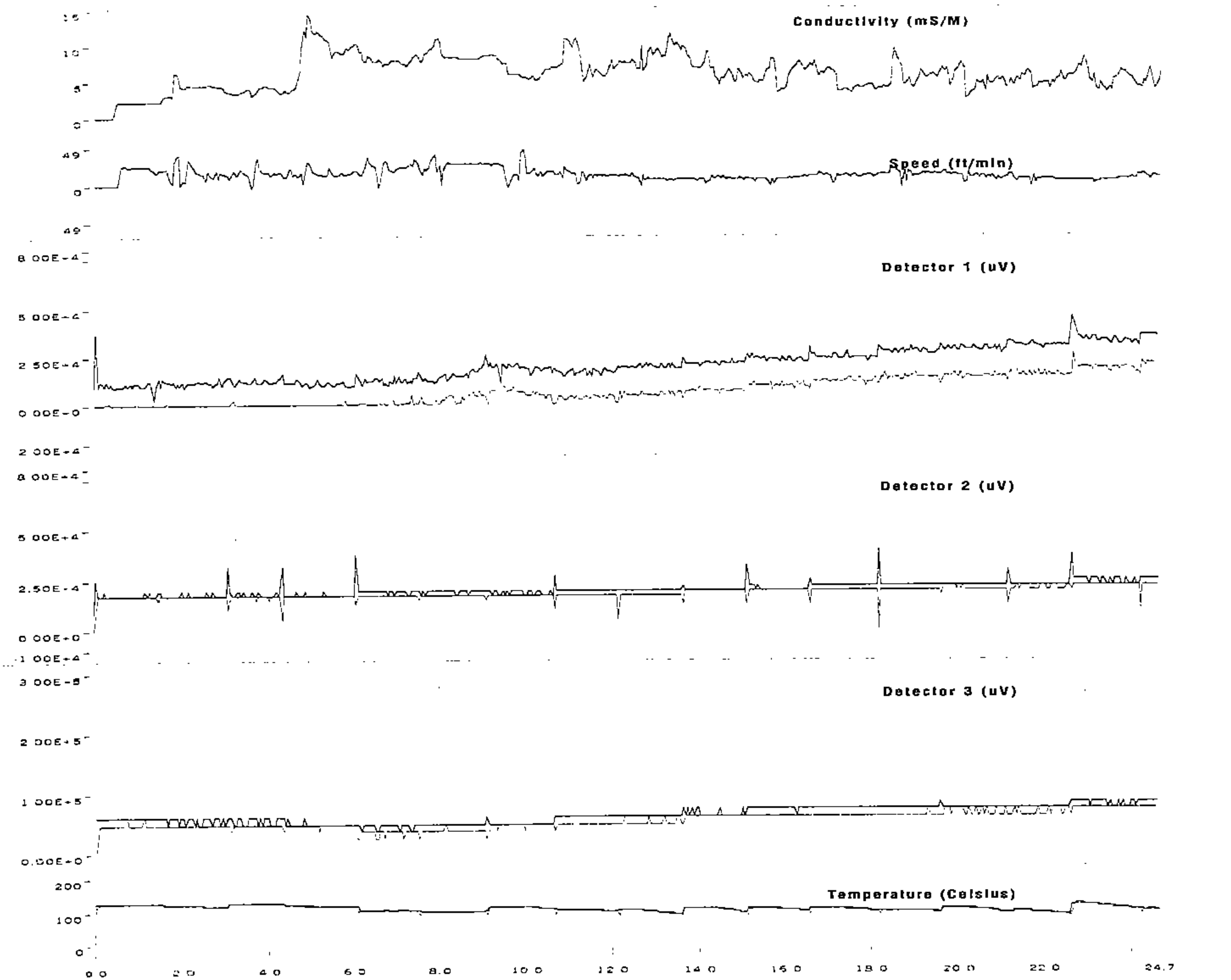

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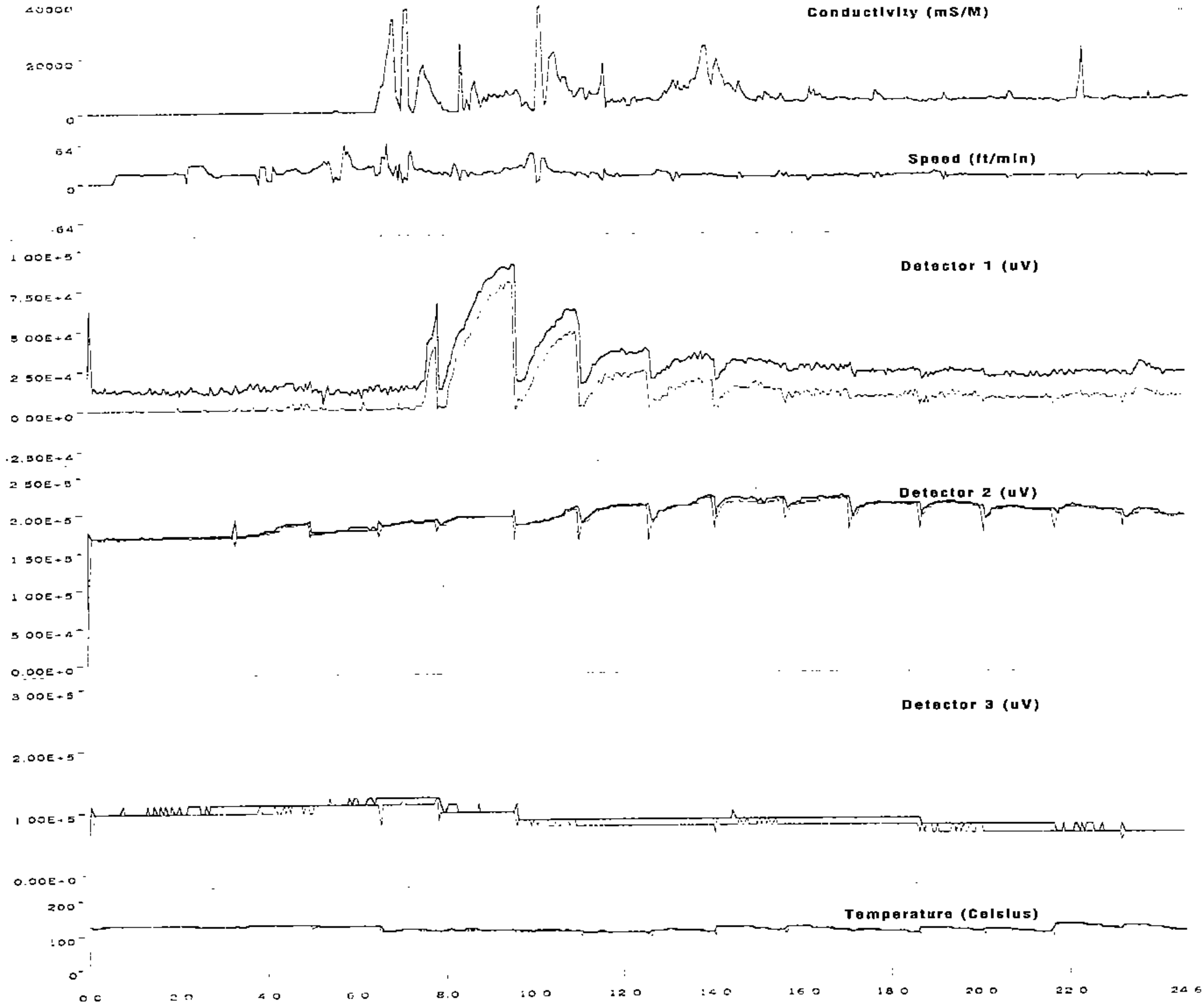

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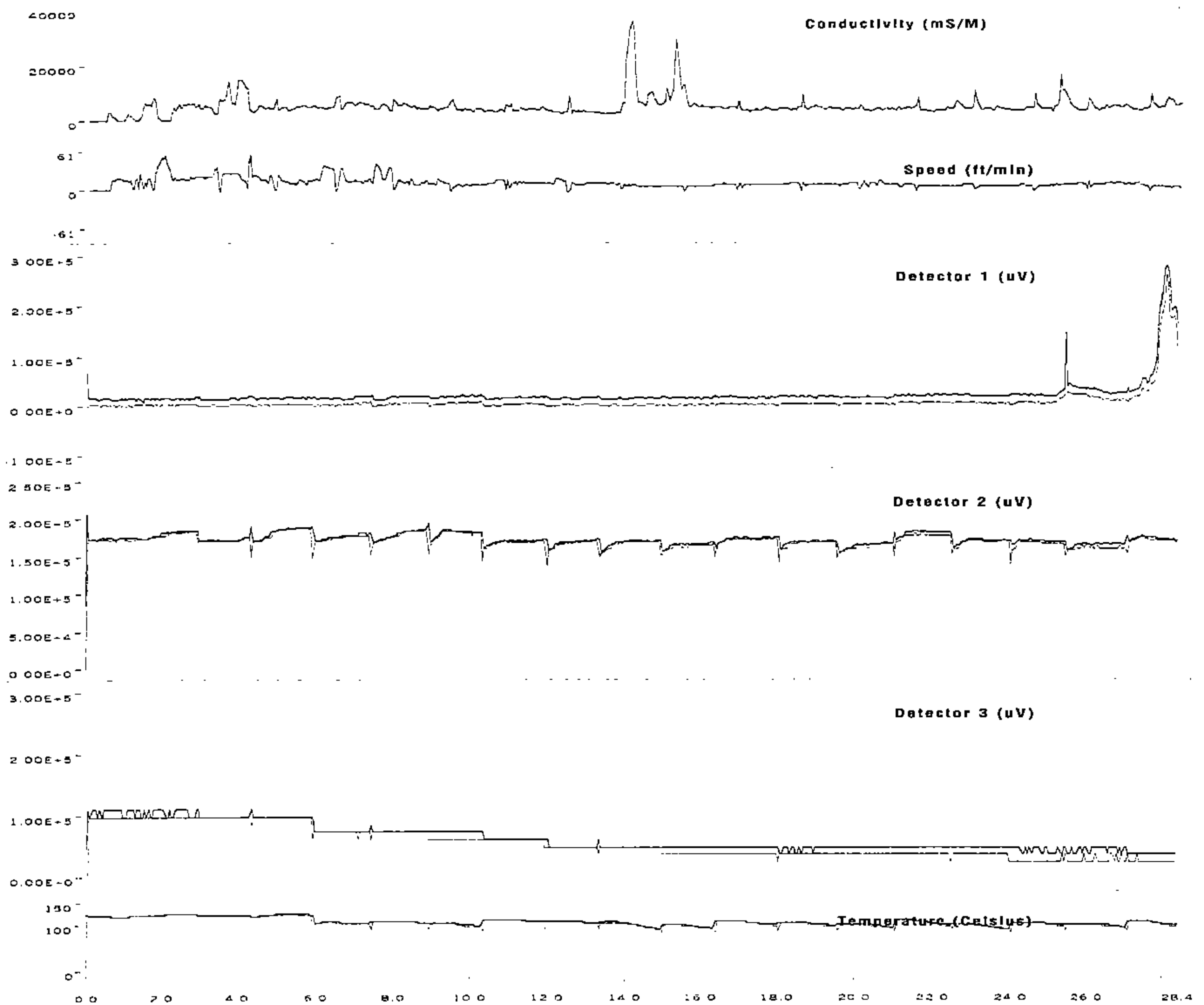

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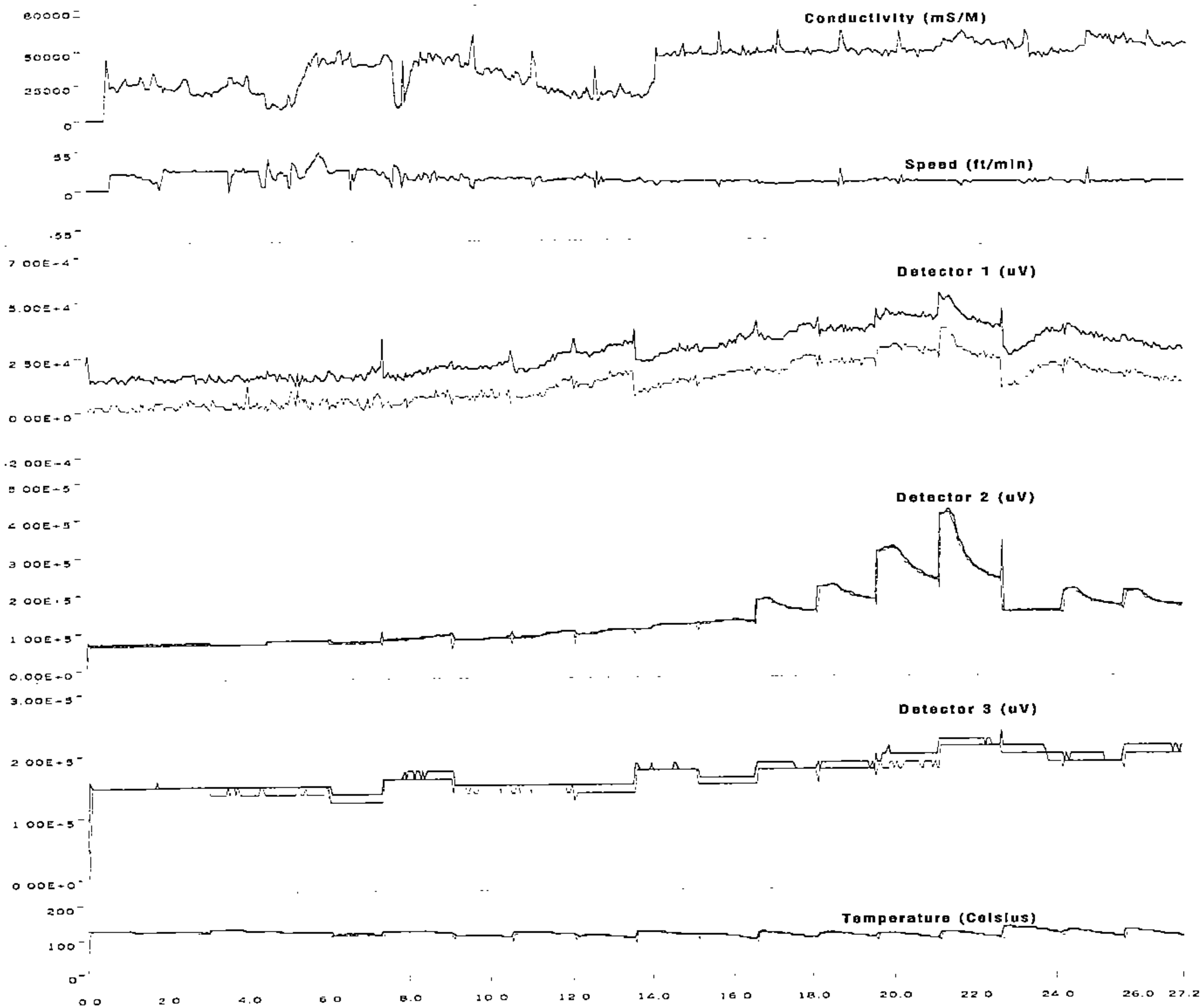

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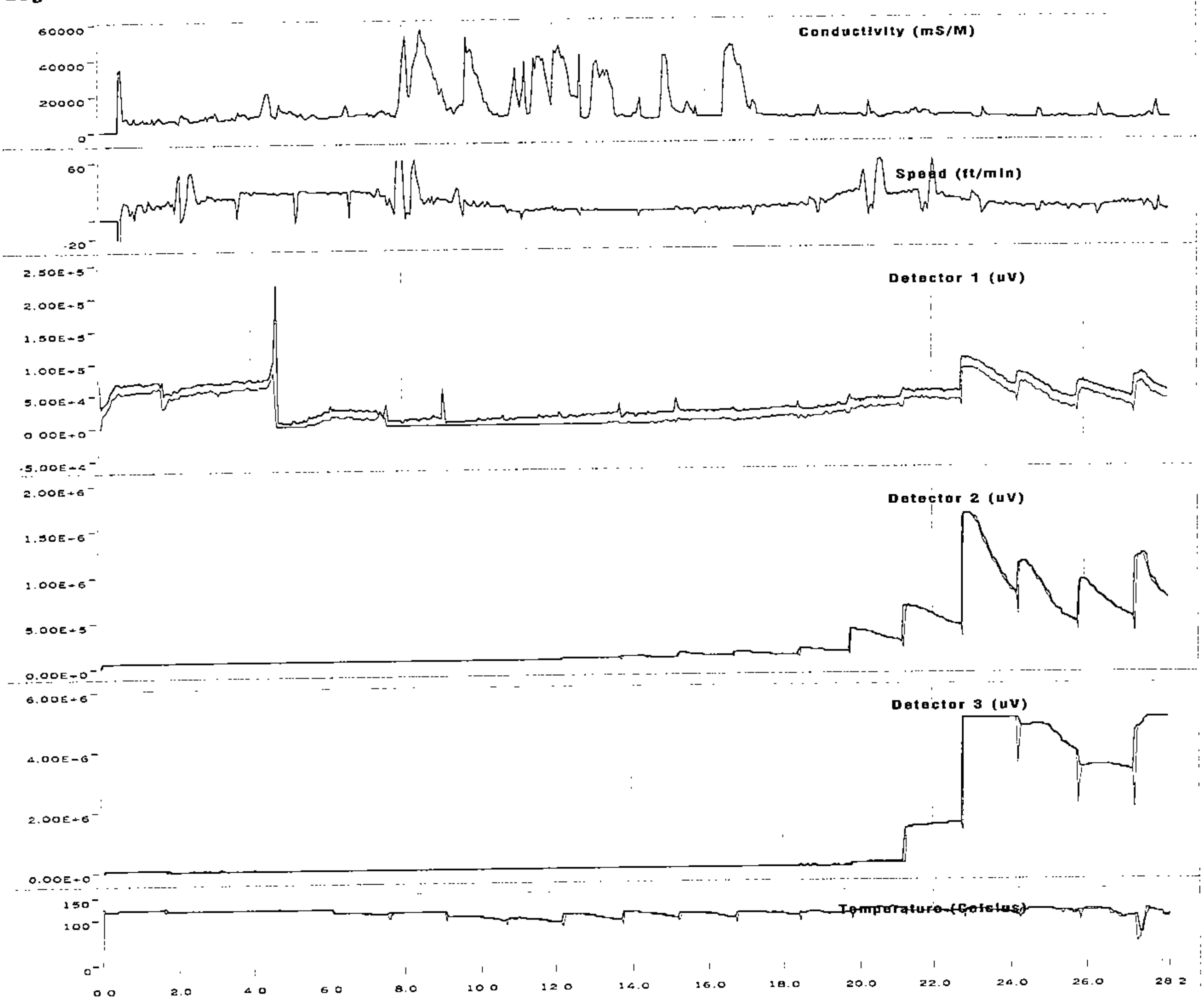

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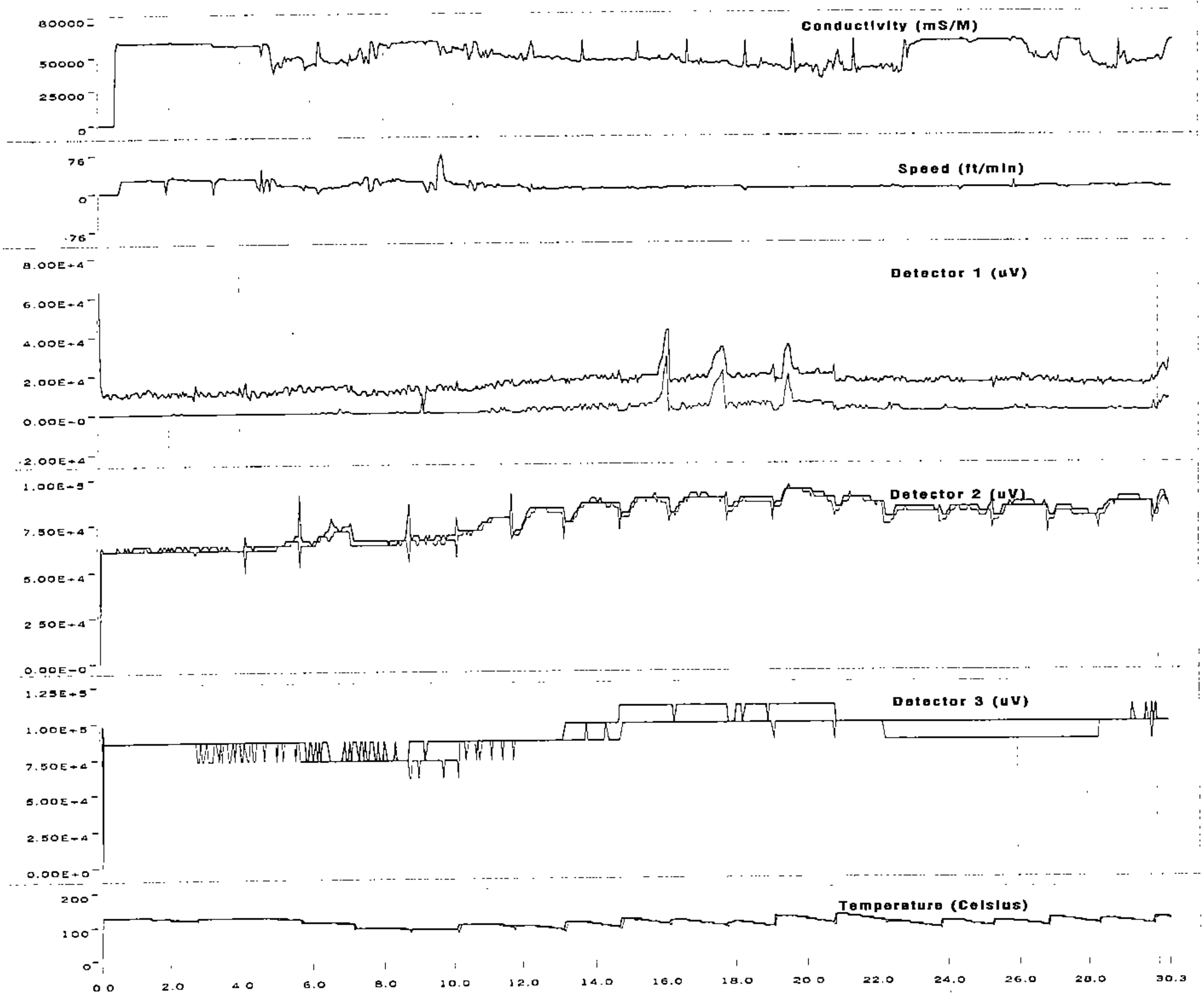

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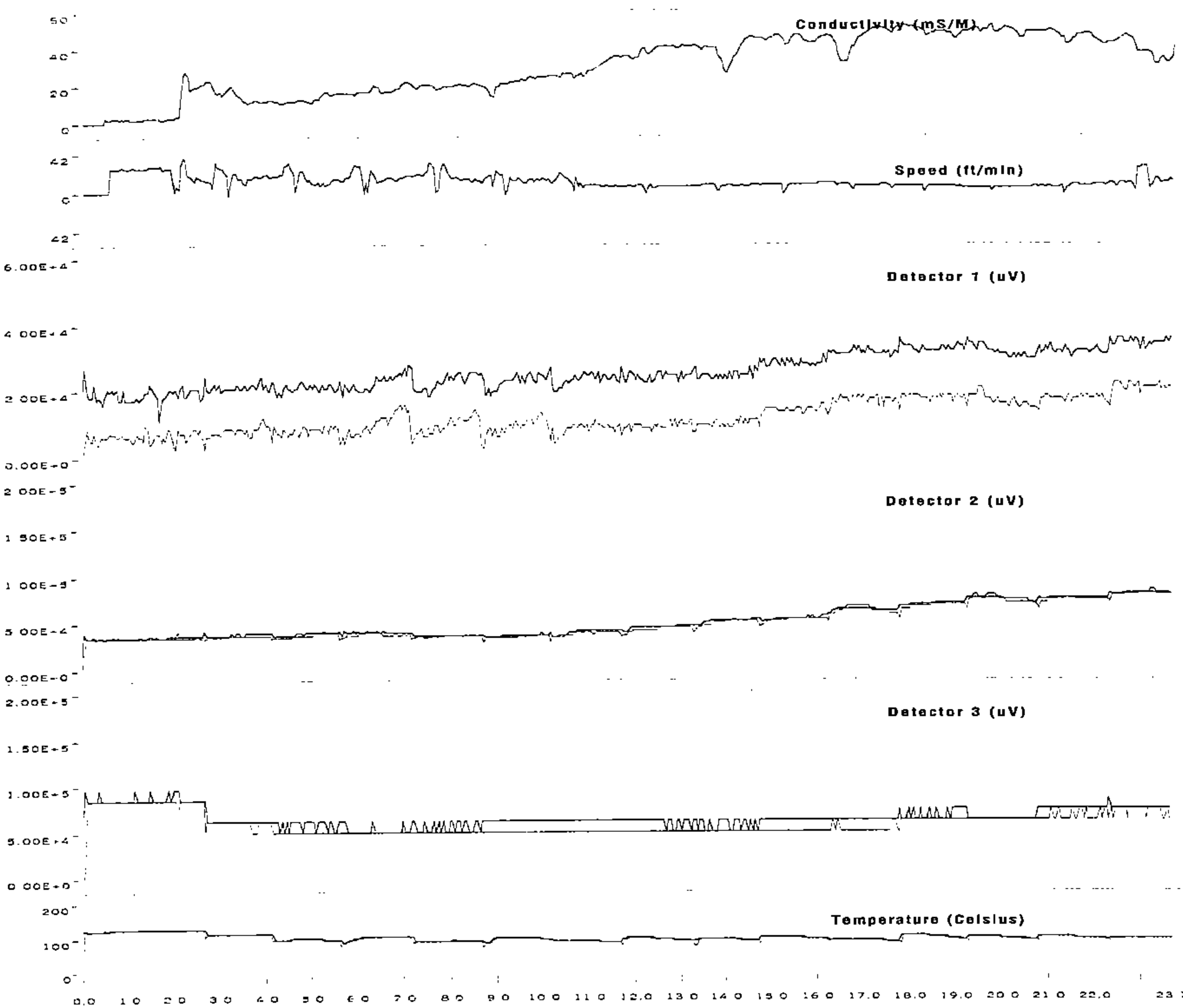

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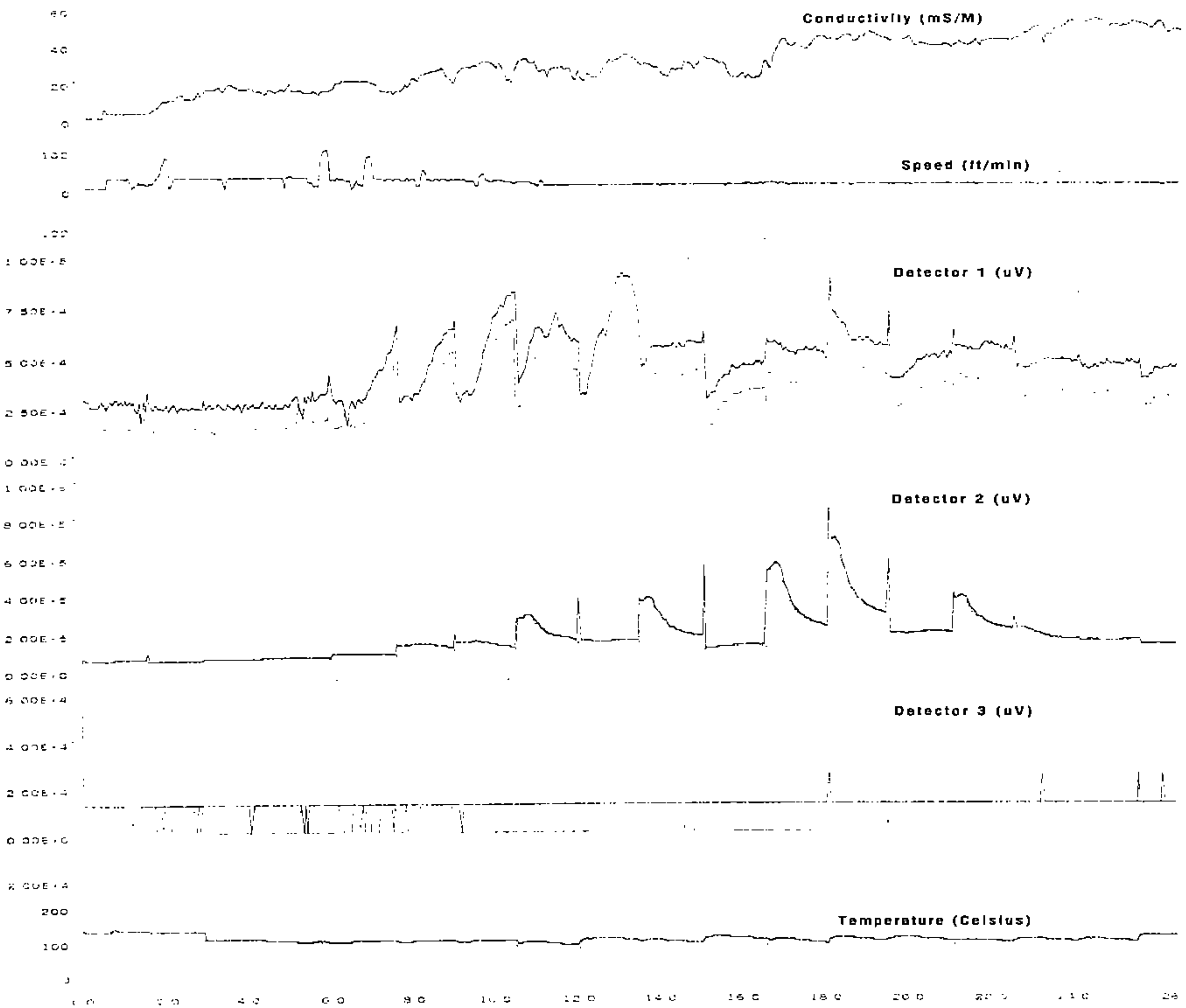

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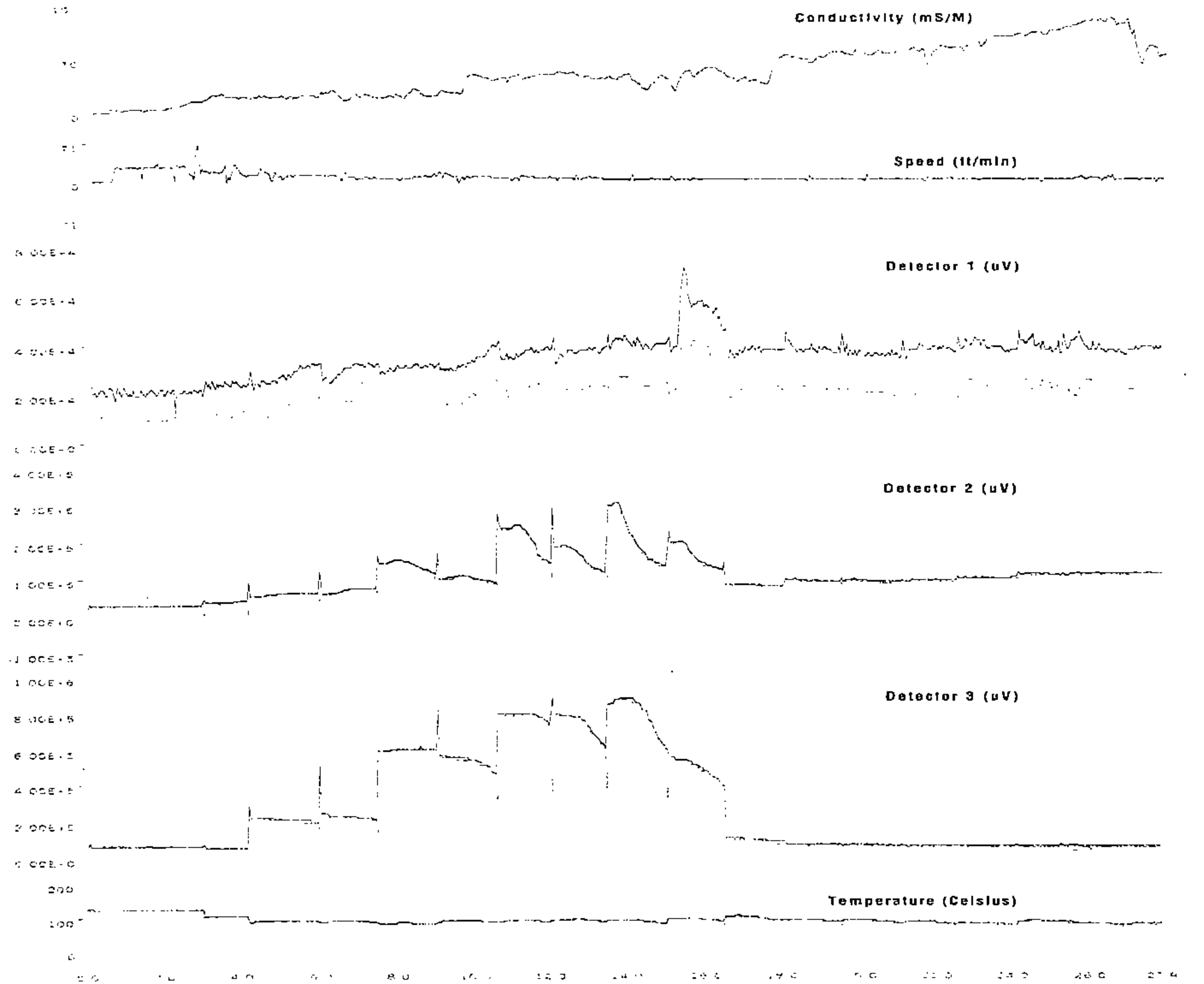

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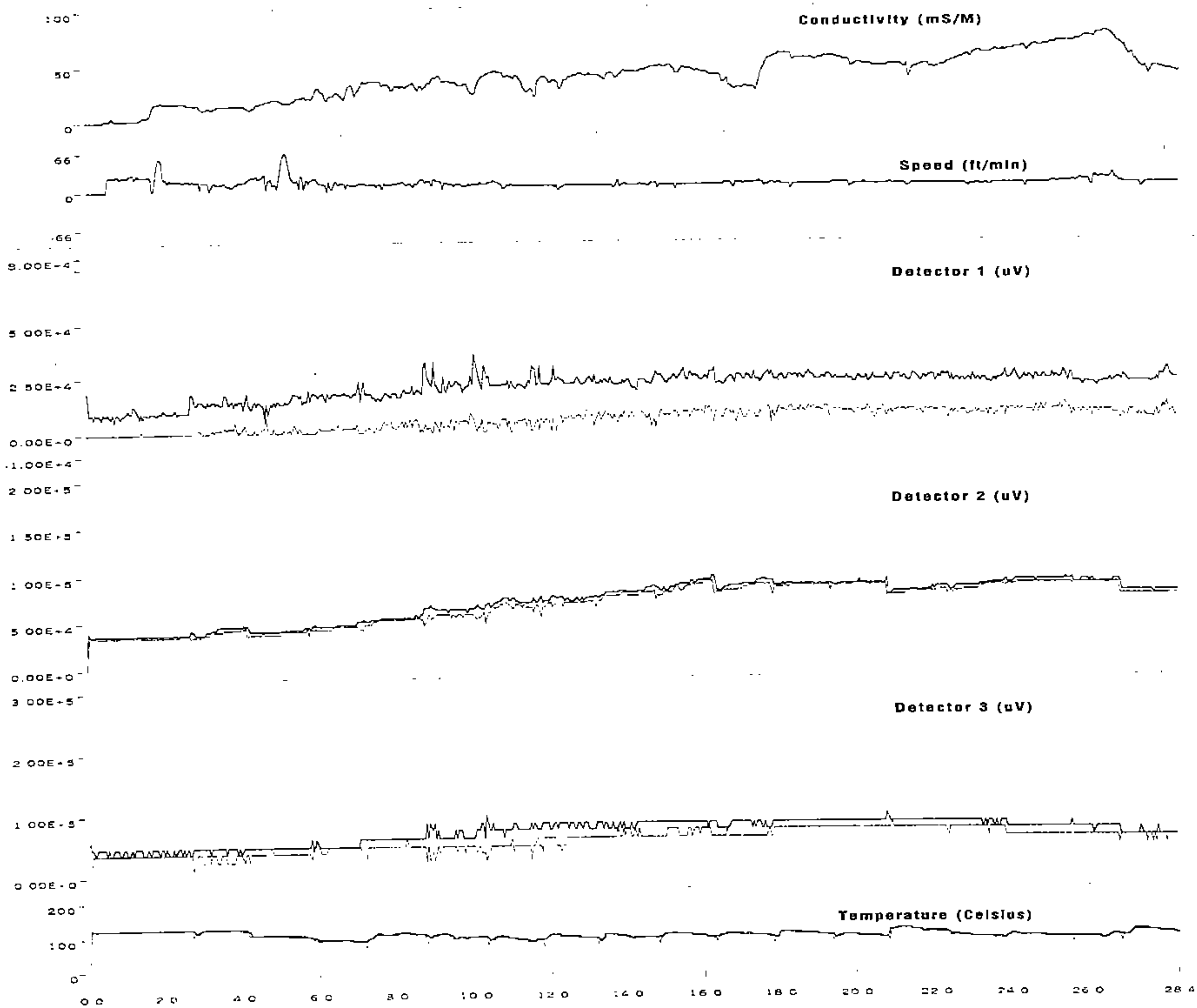

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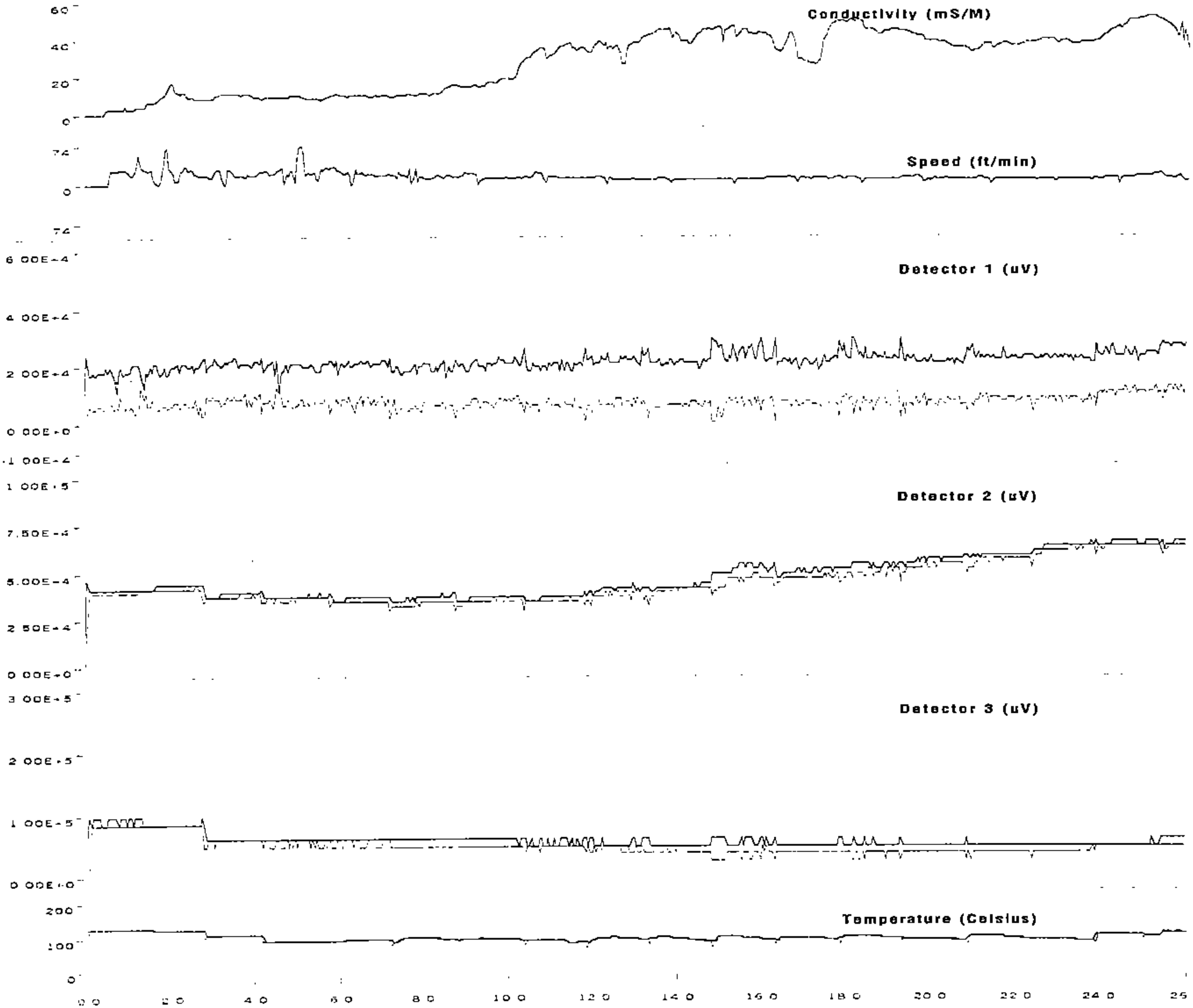

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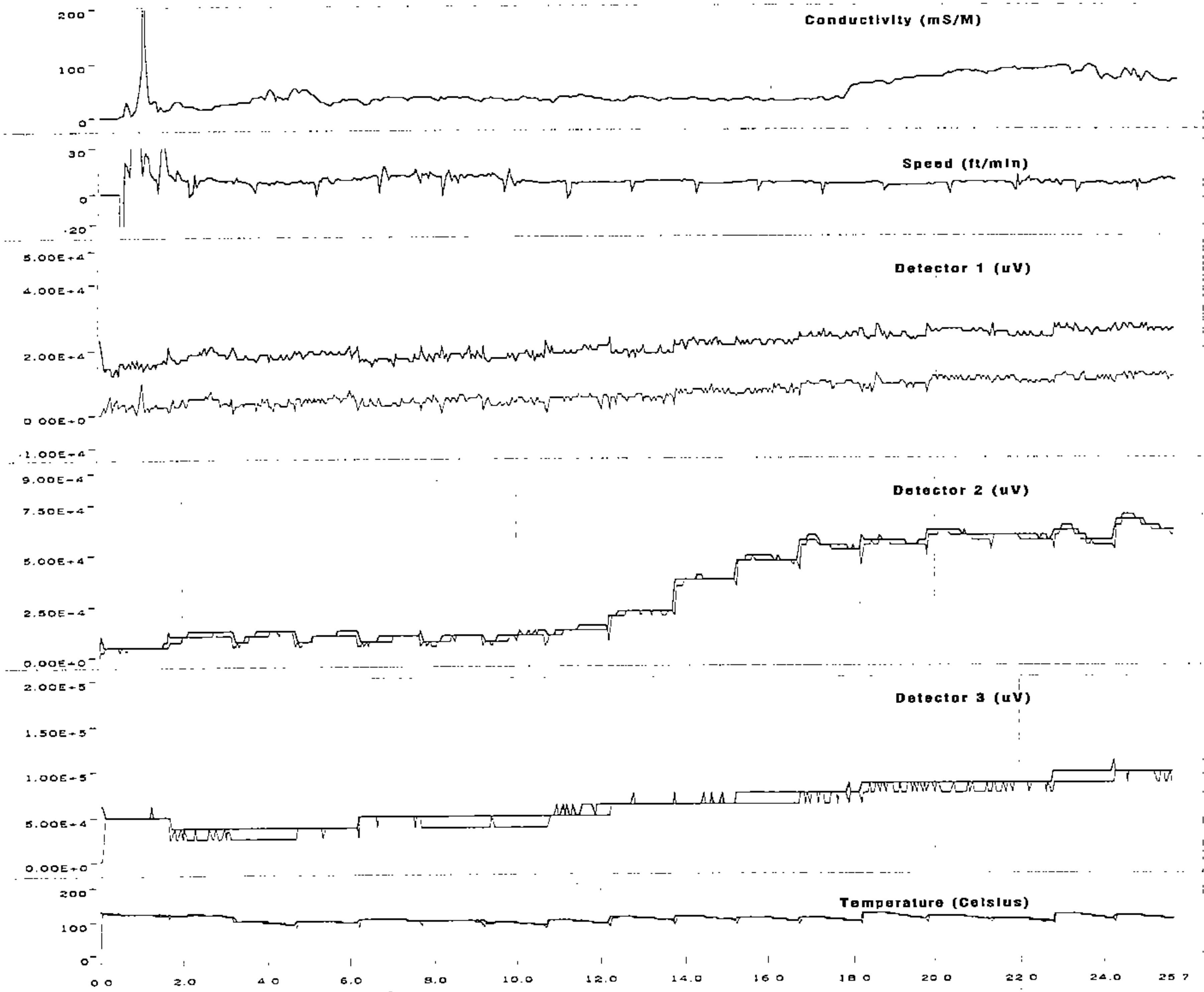

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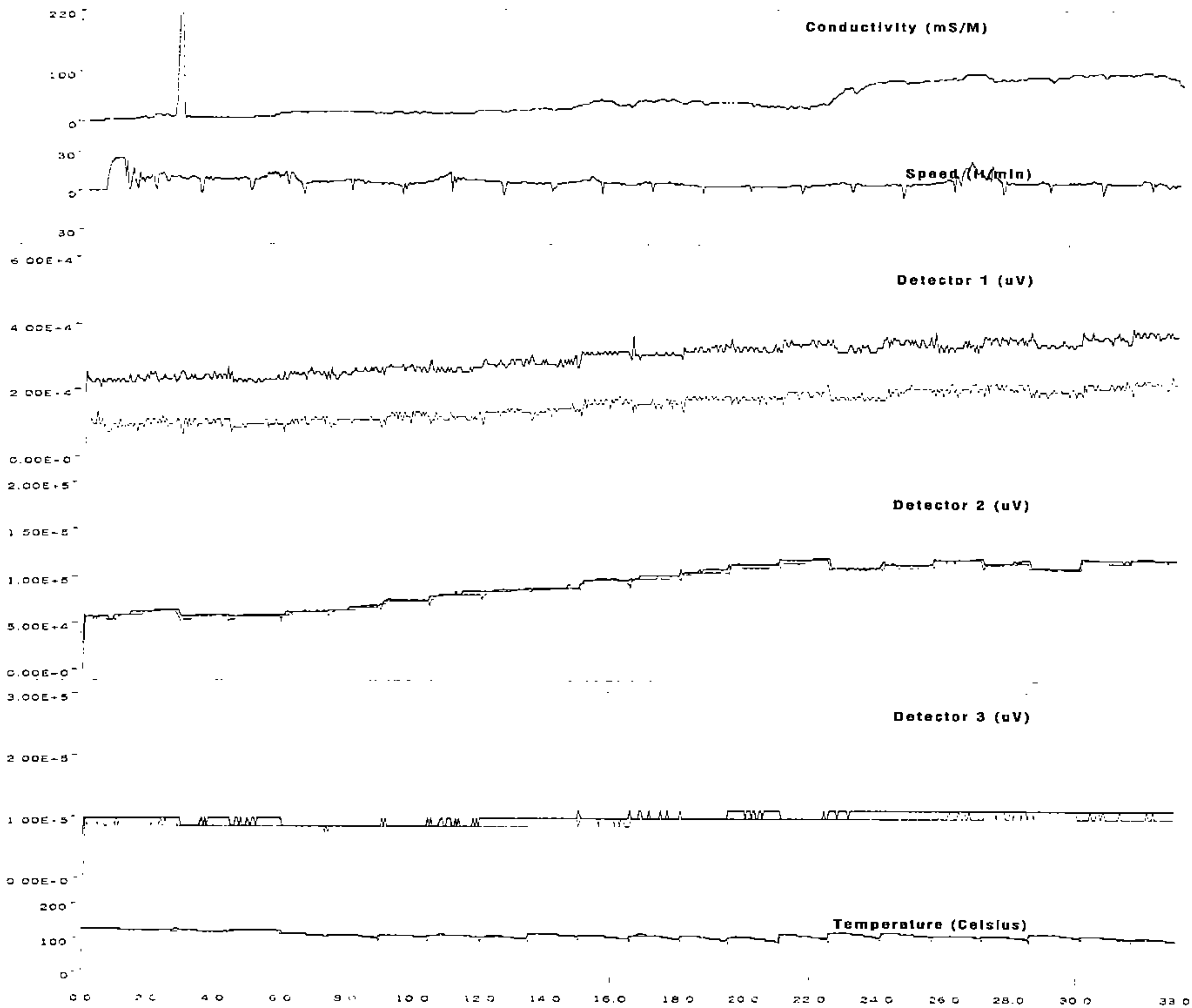

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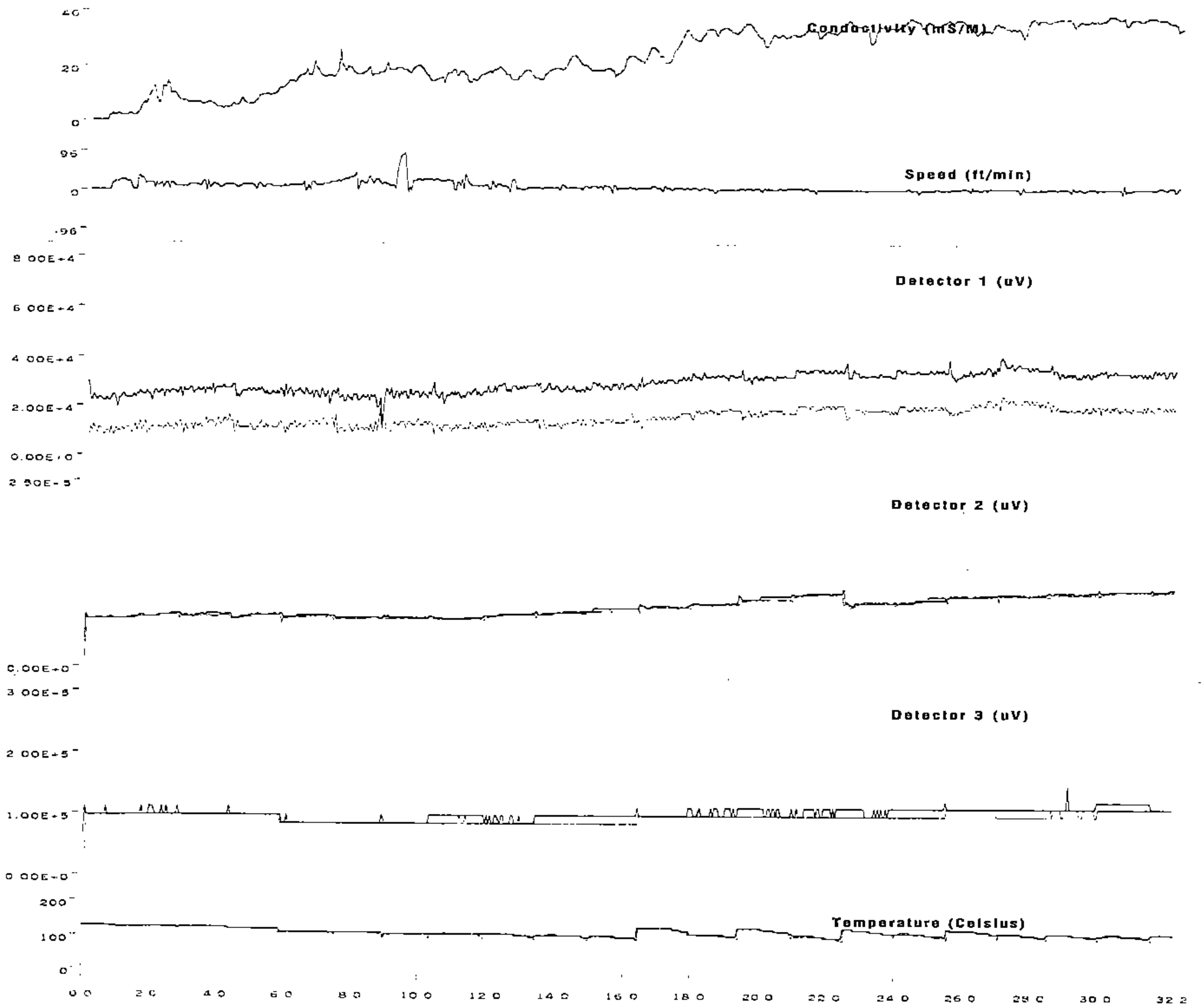

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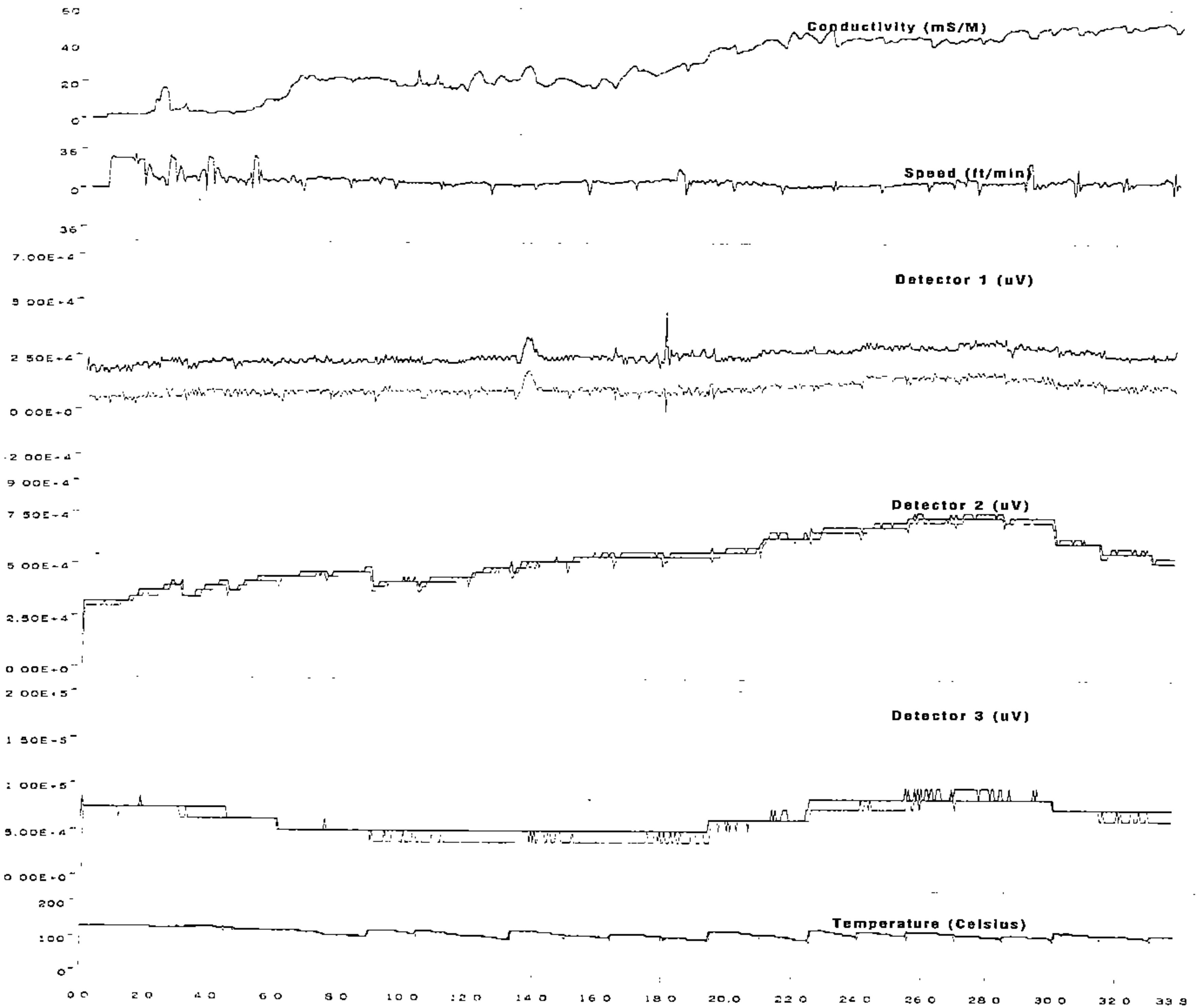

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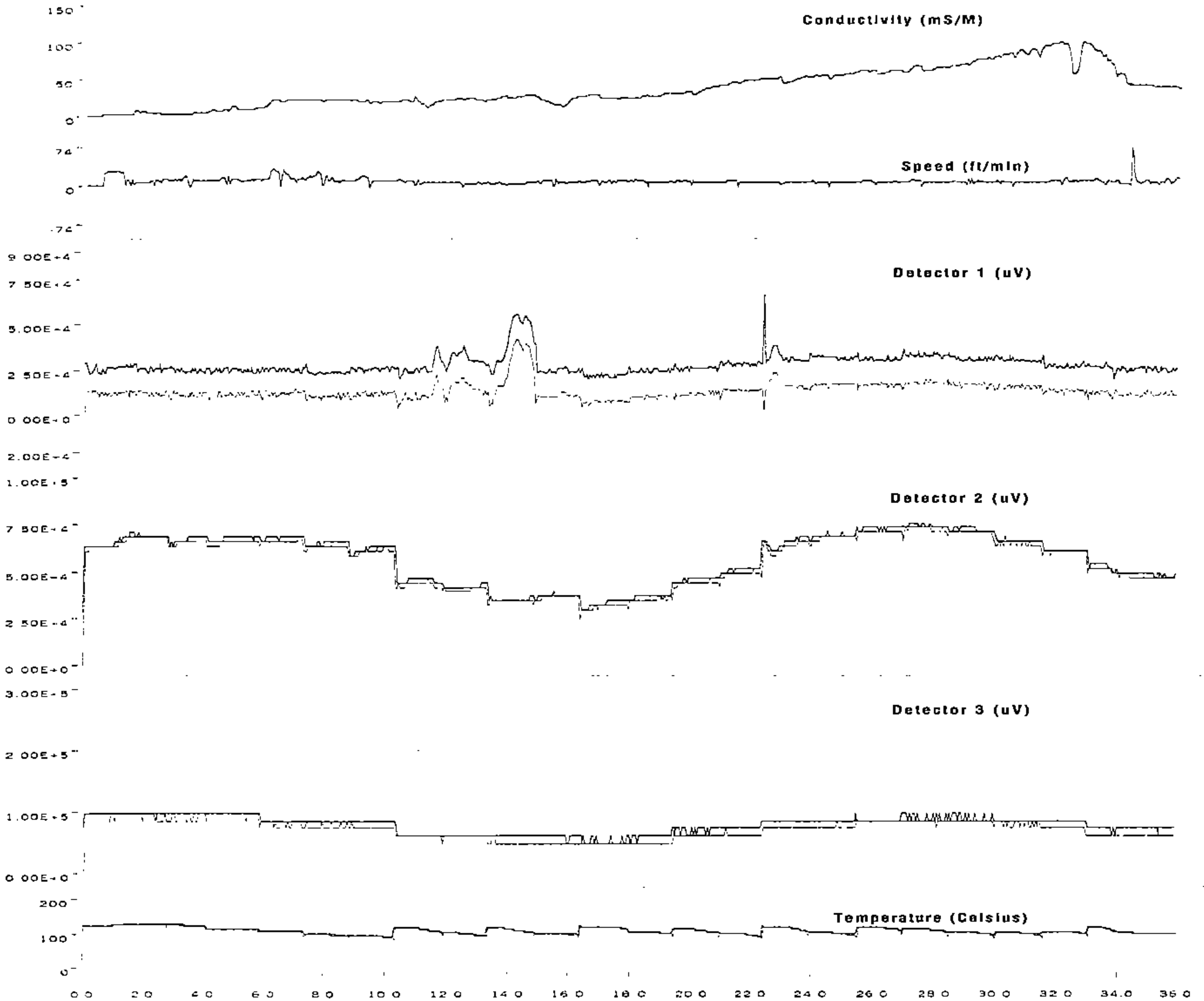

MIP LOGS
REPROCESSED FOR STANDARDIZED SCALE

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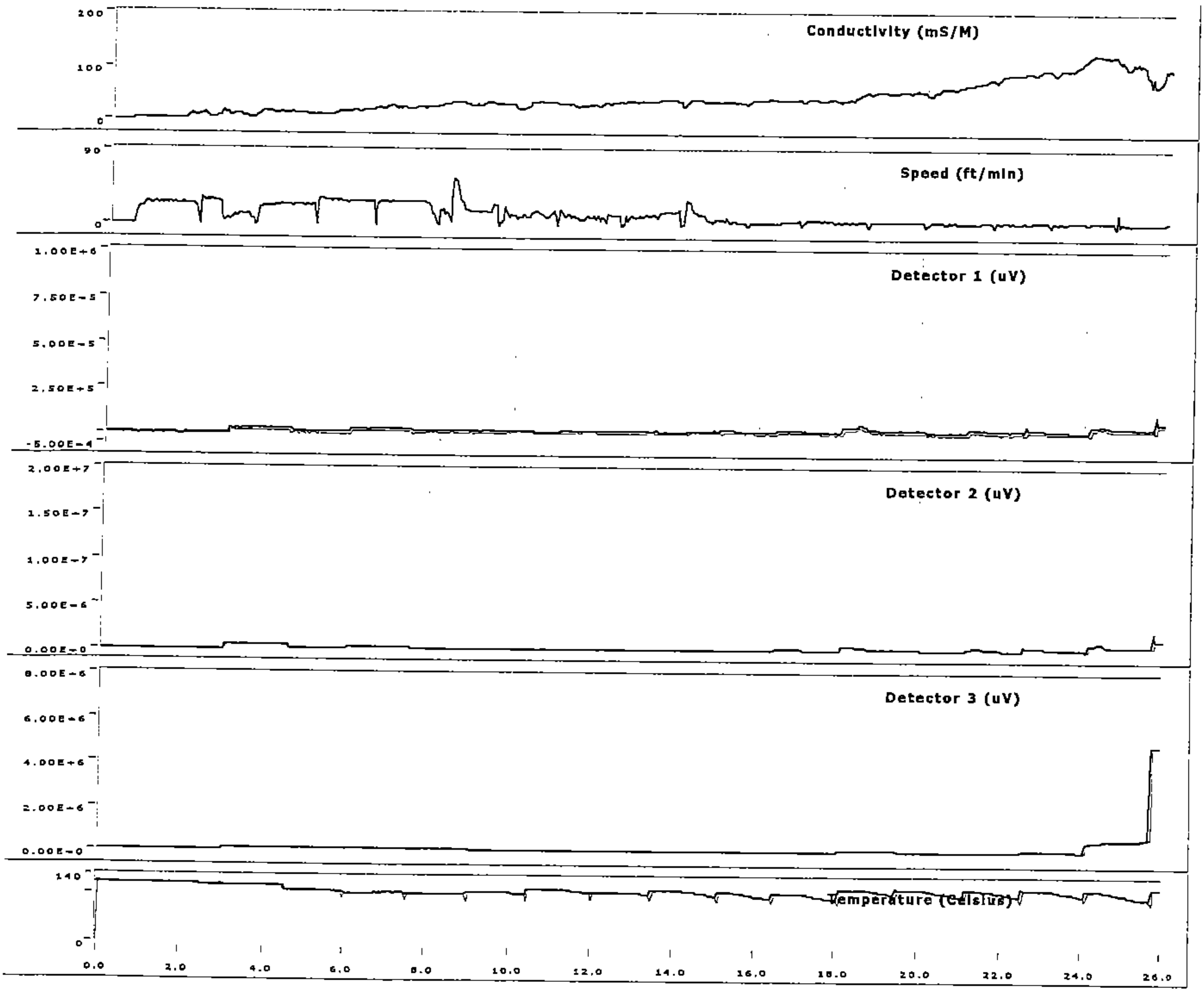

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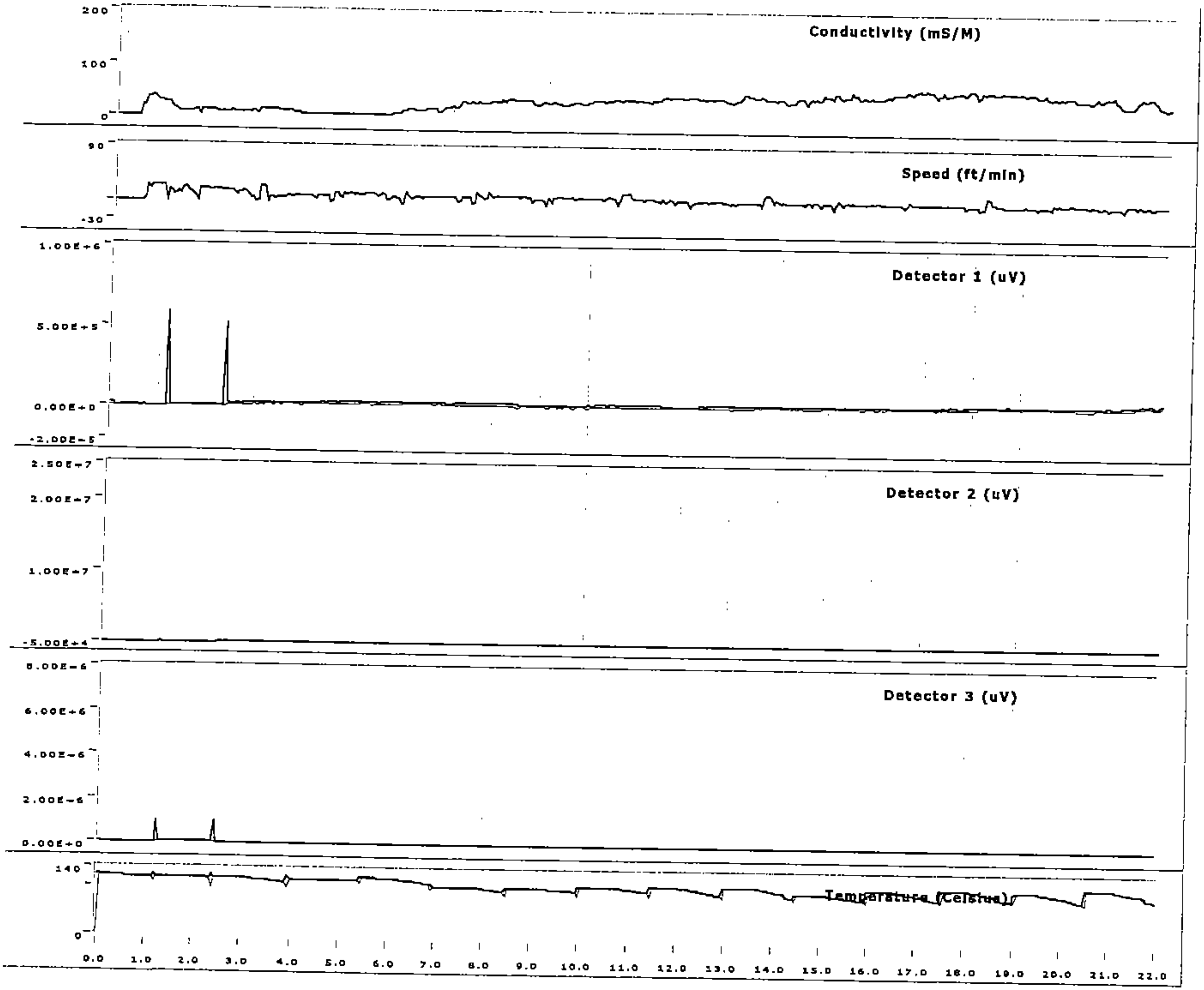

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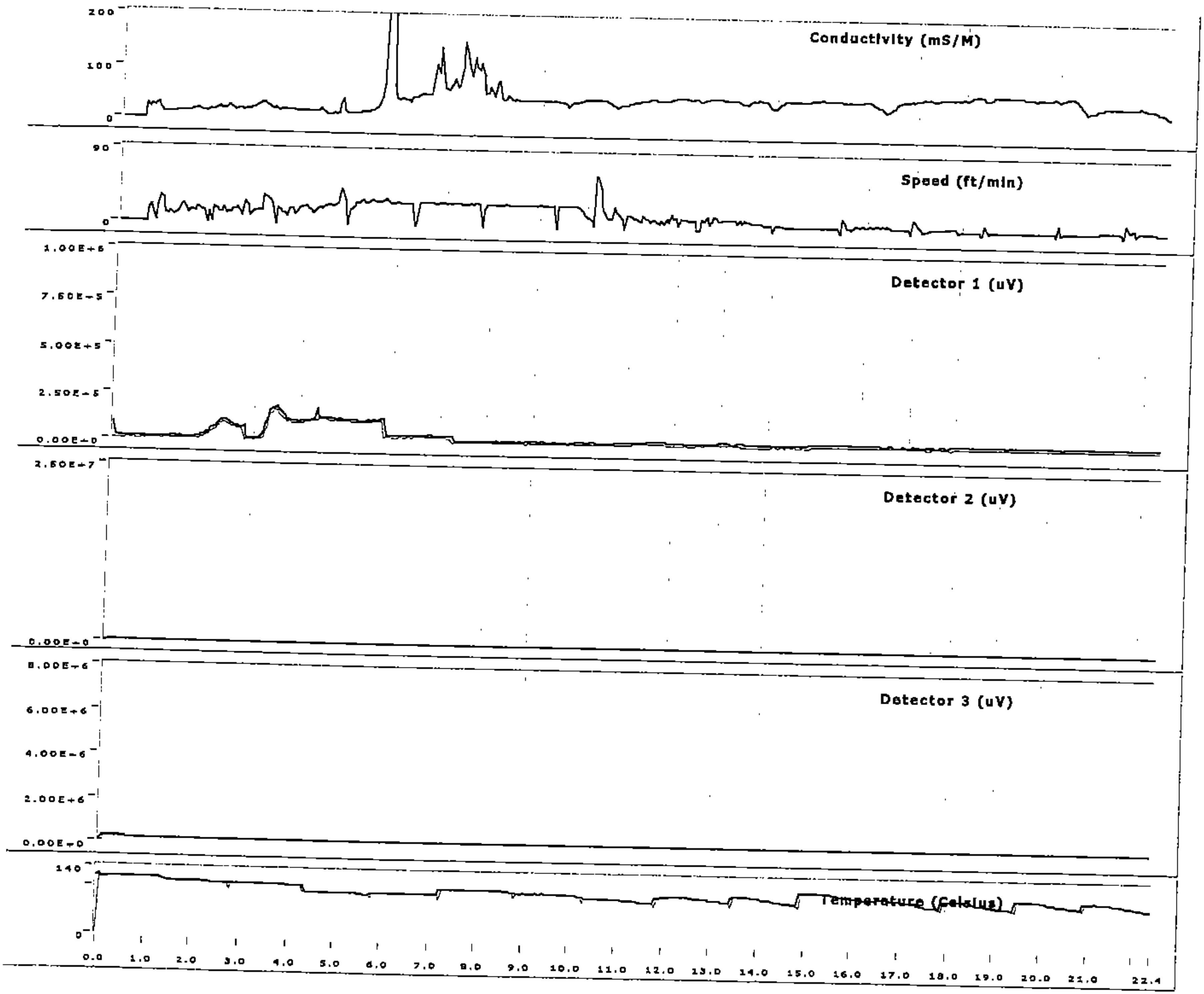

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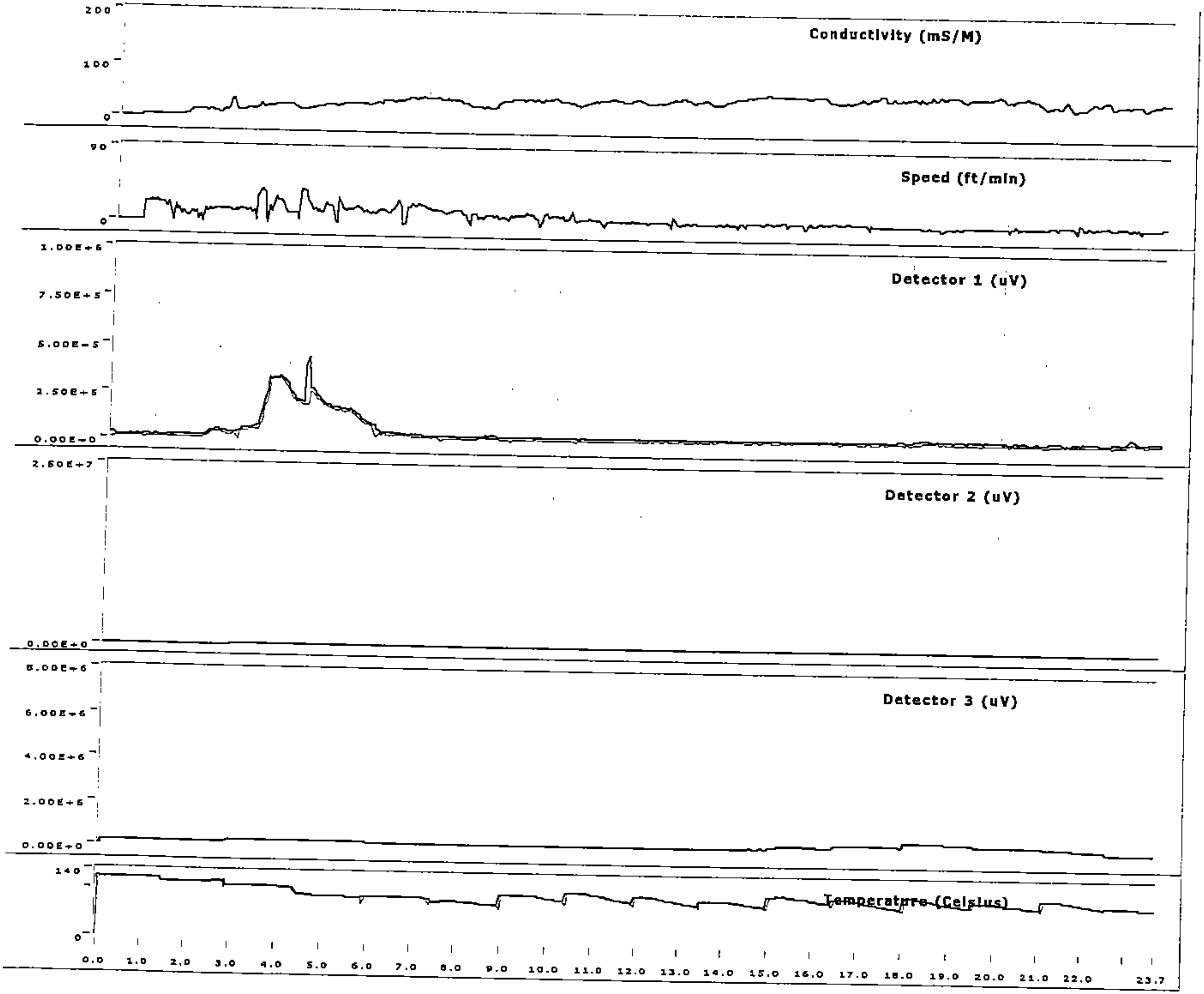

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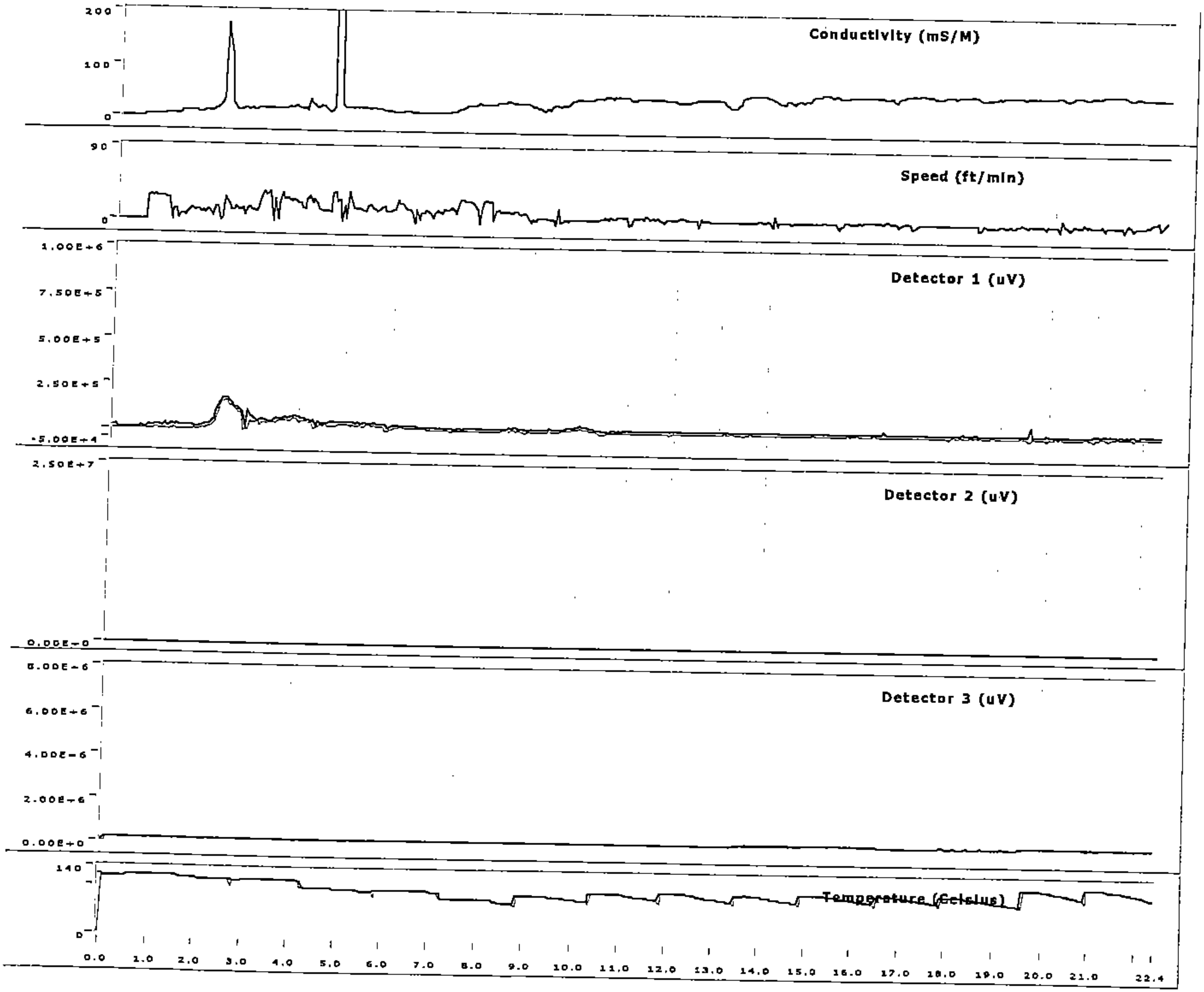

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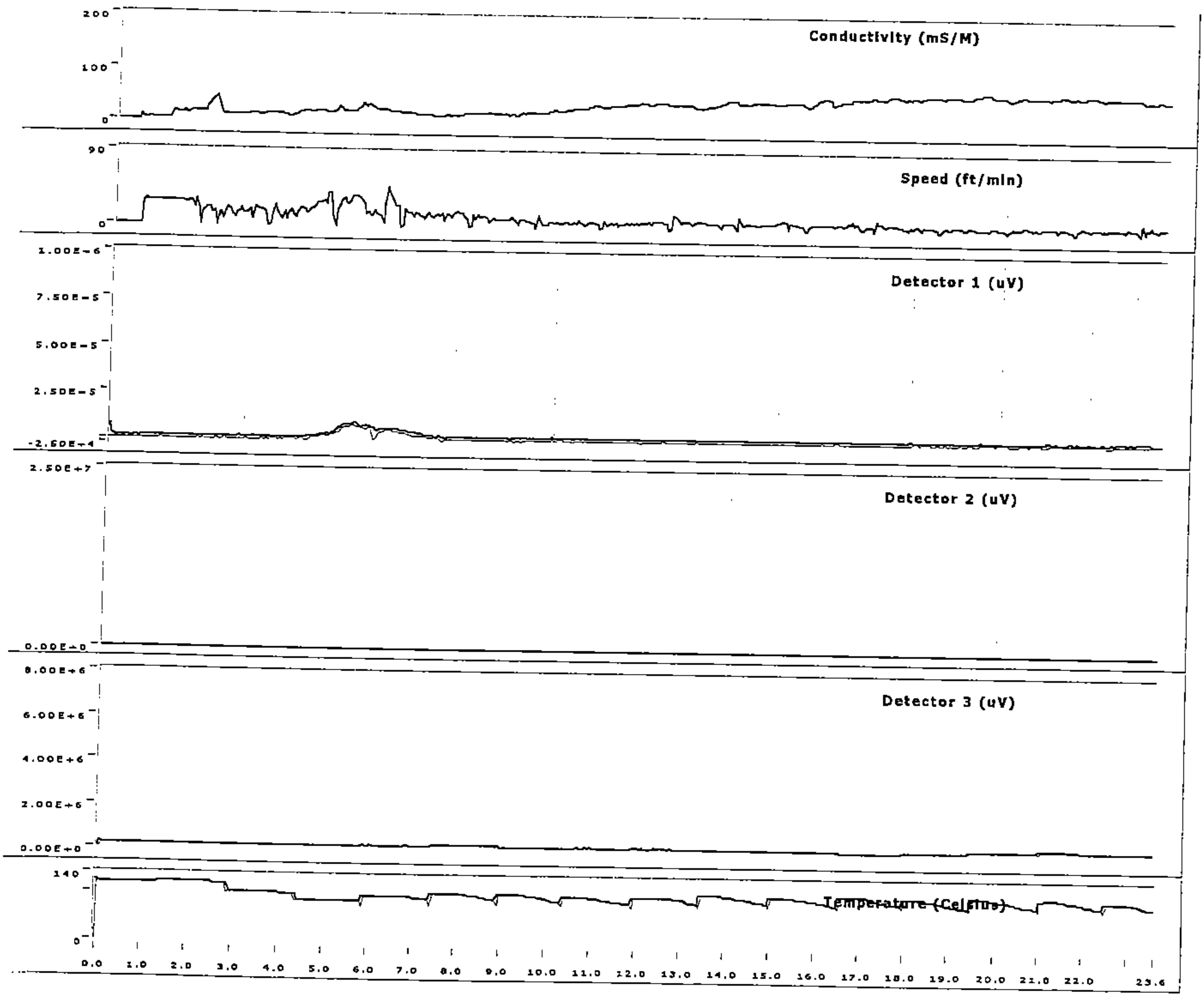

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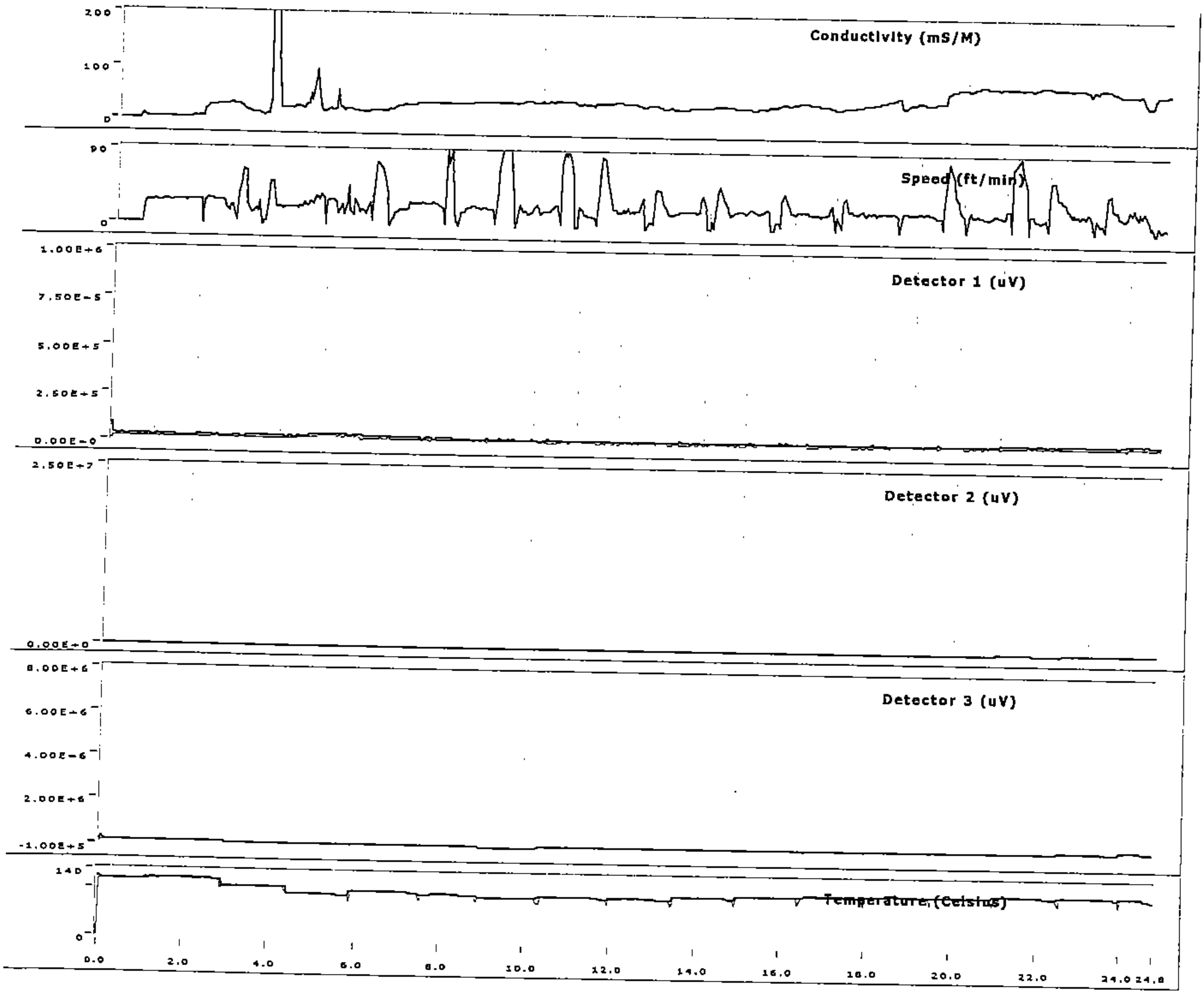

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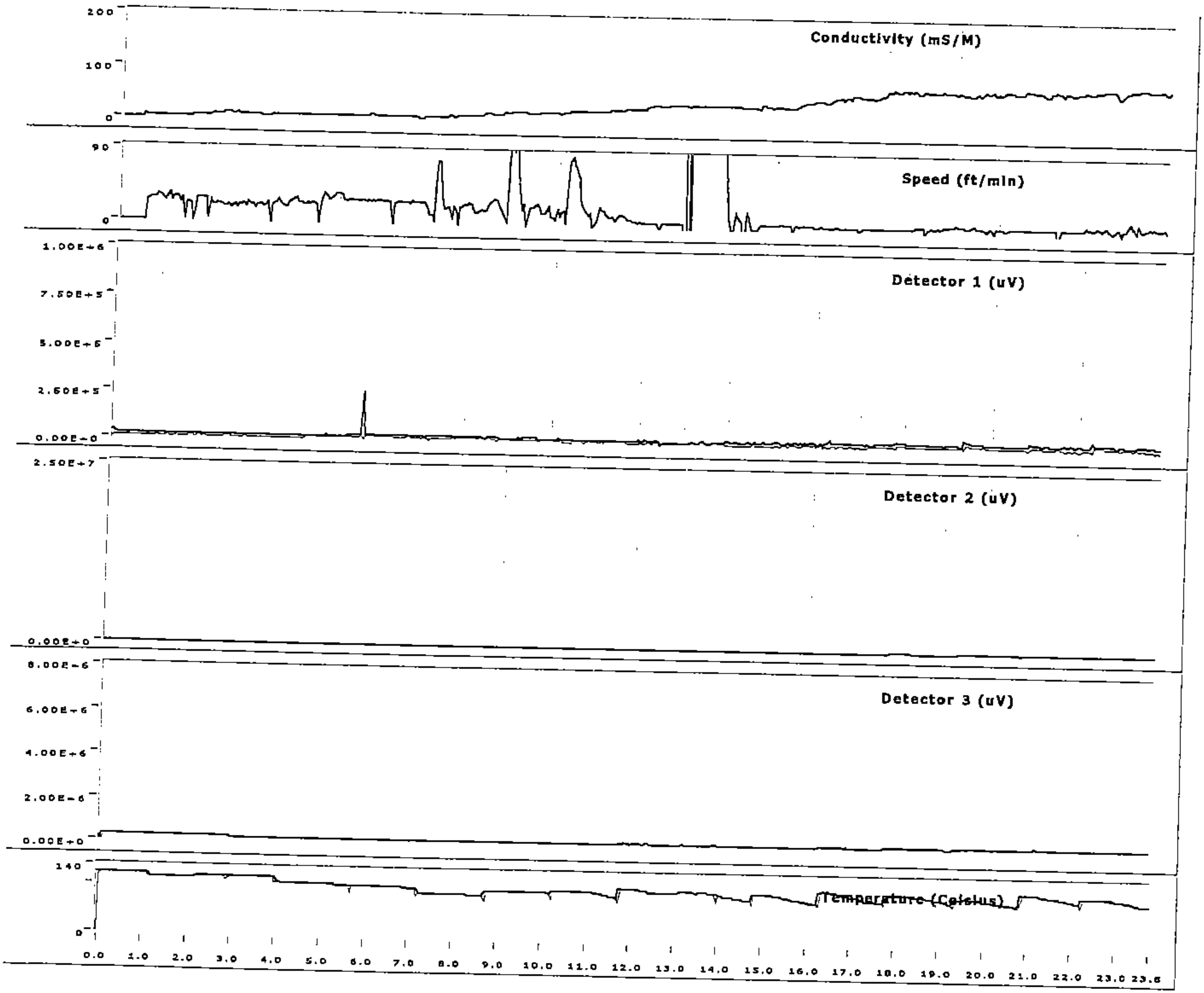

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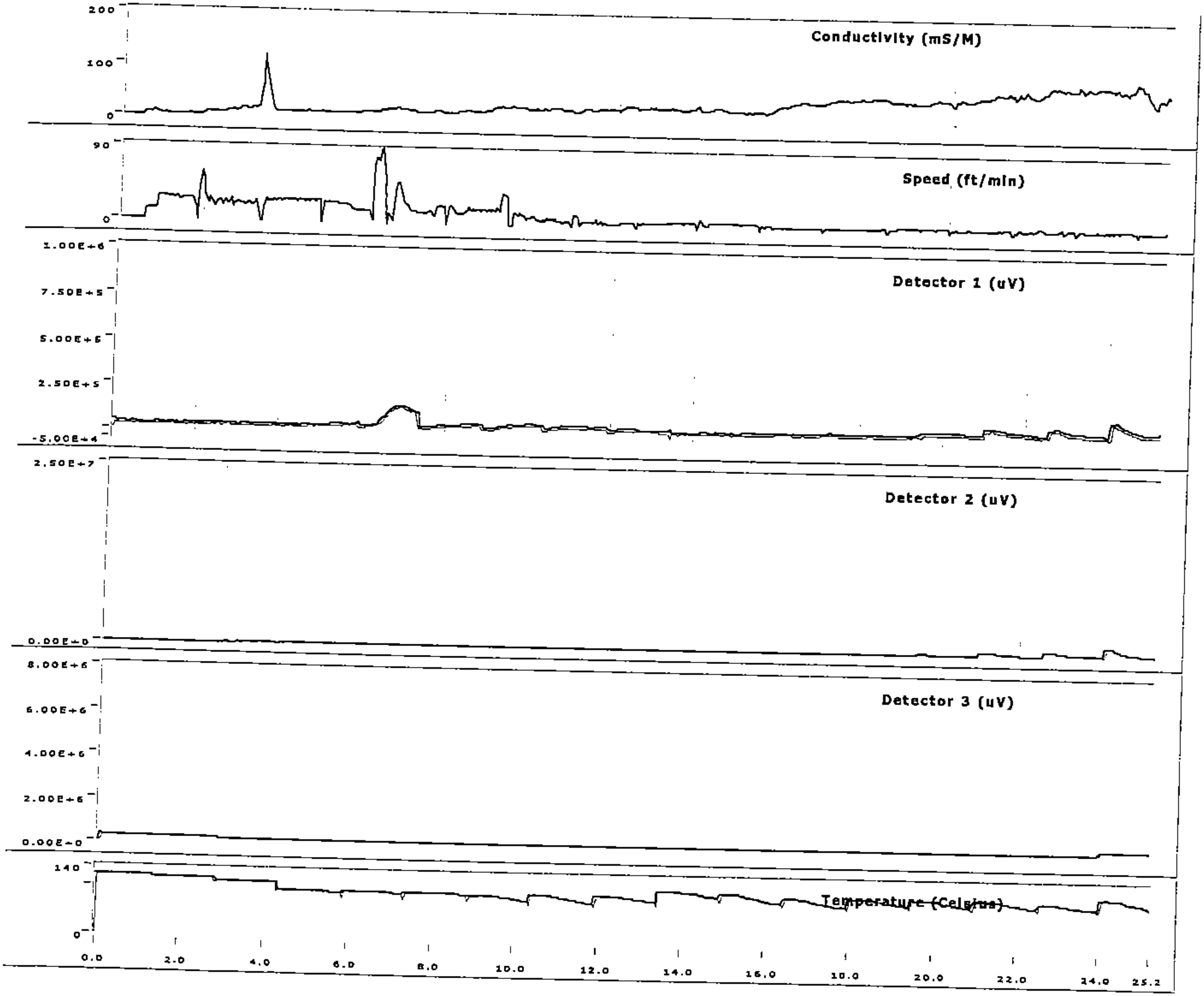

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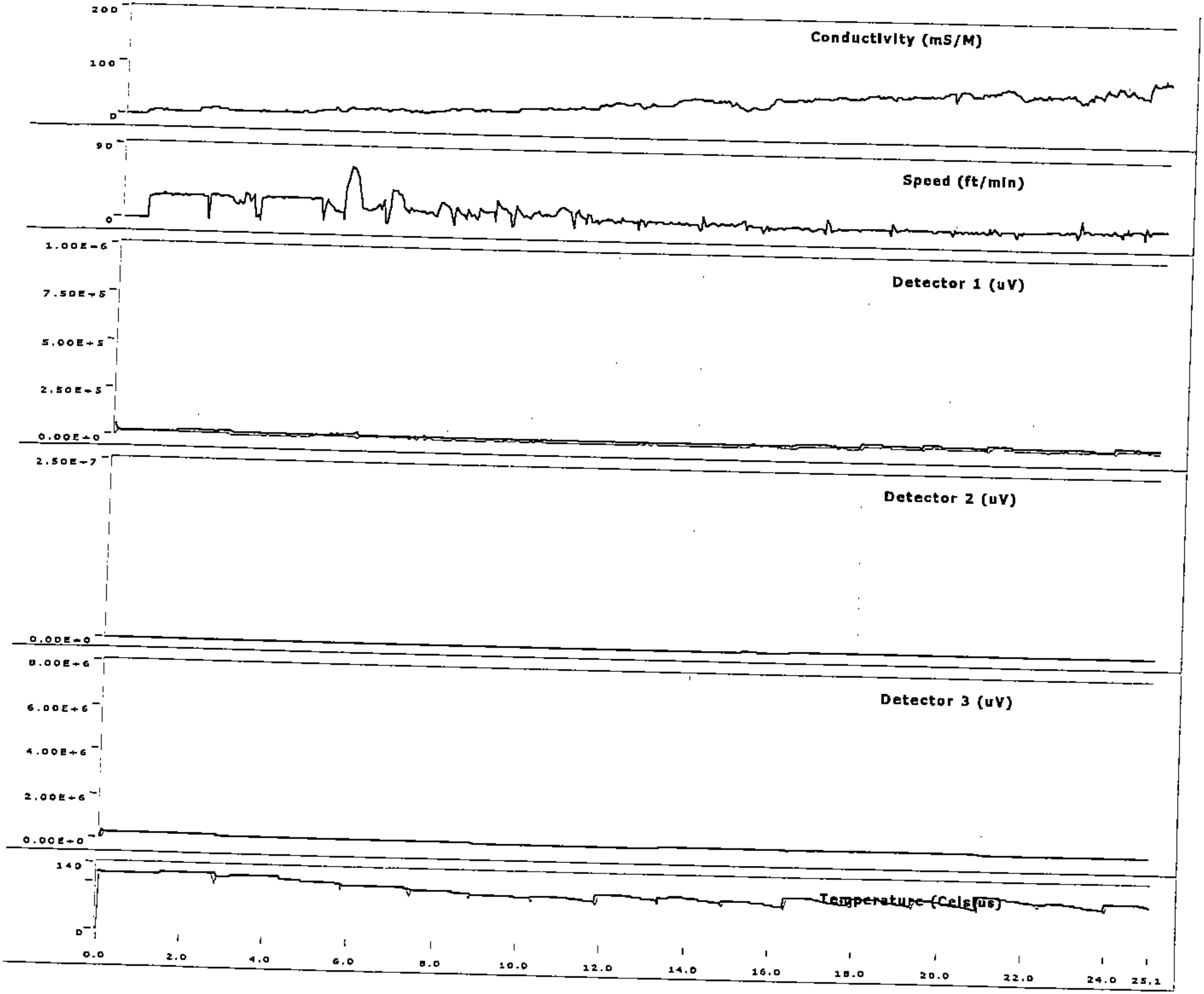

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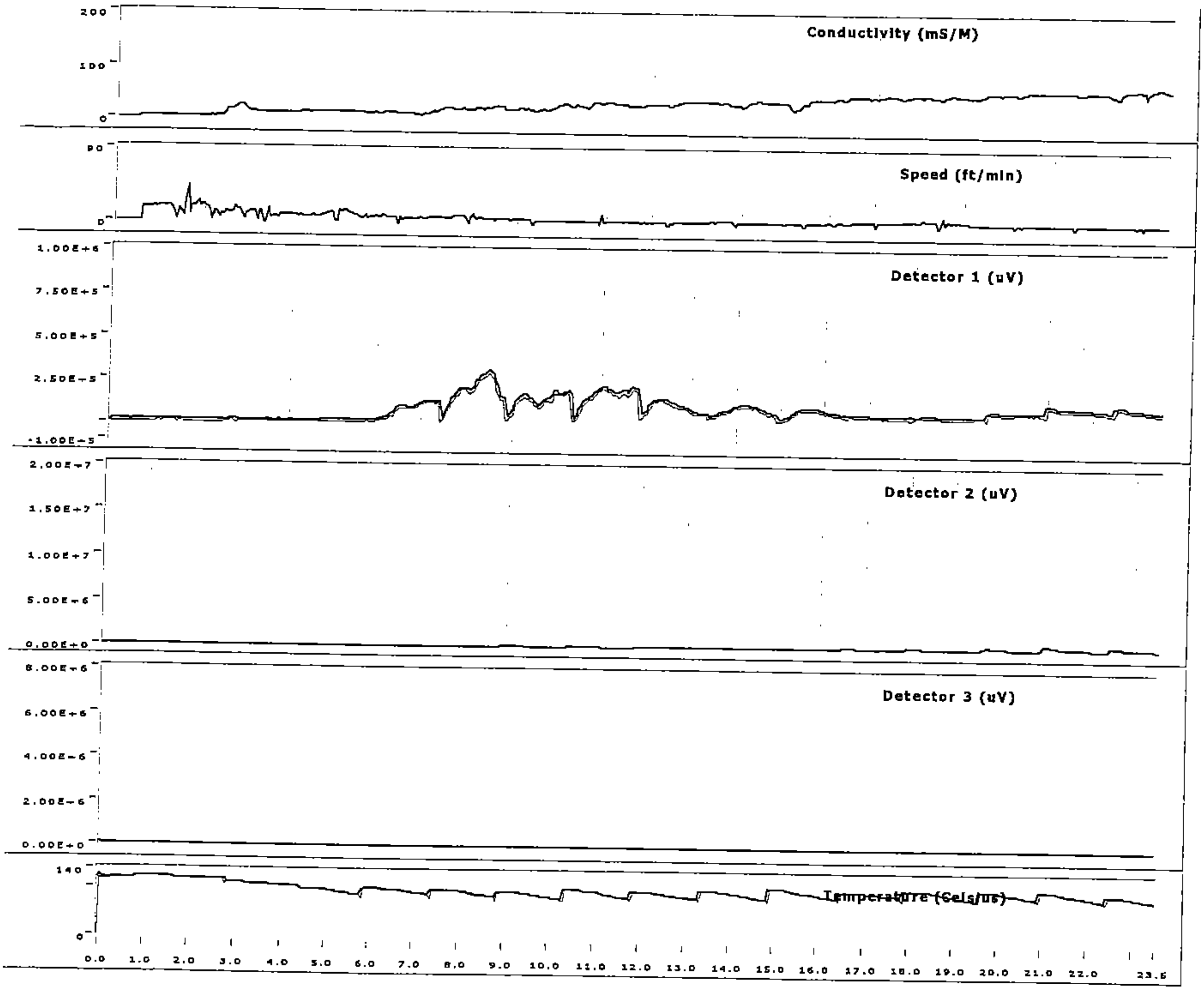

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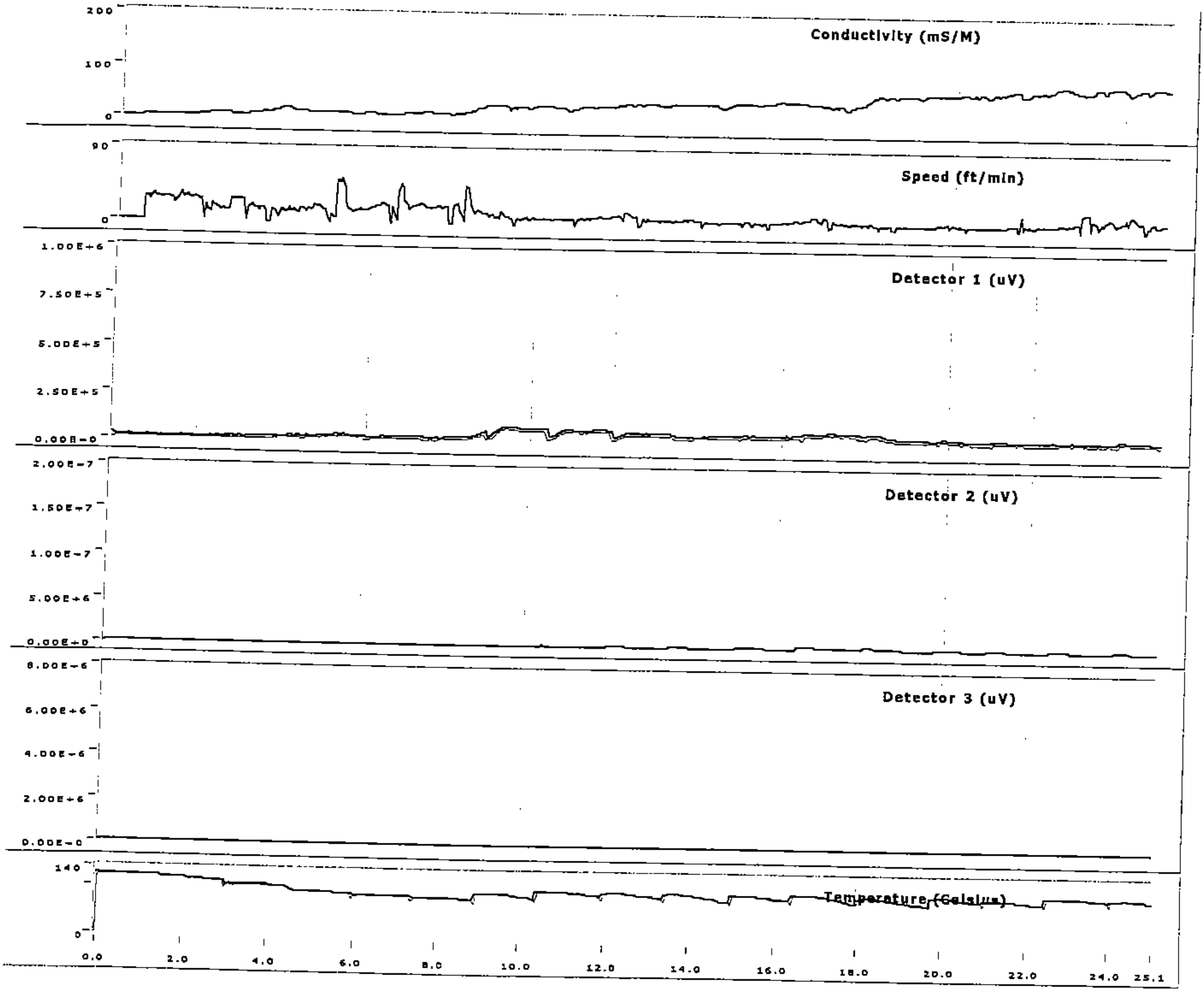

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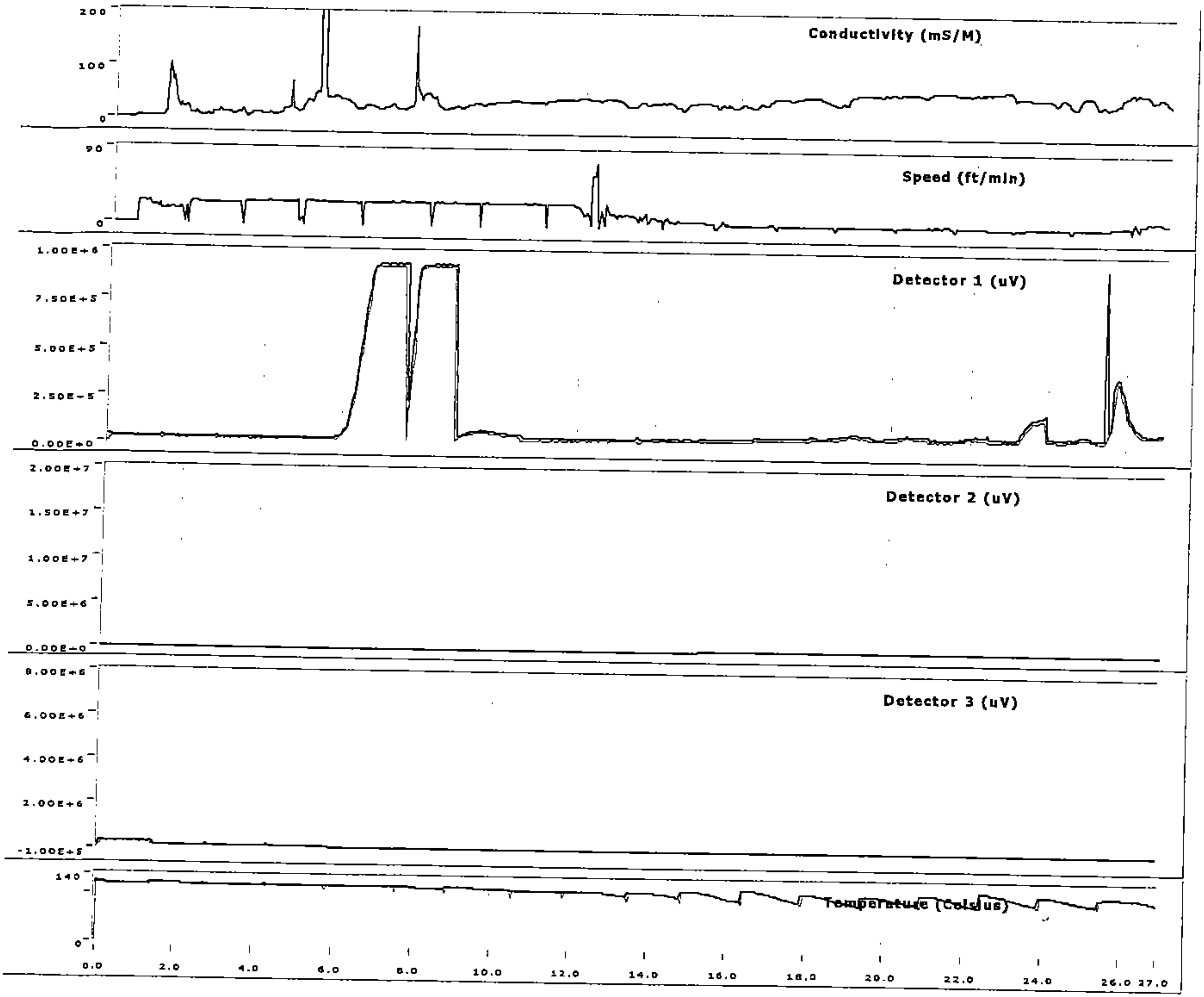

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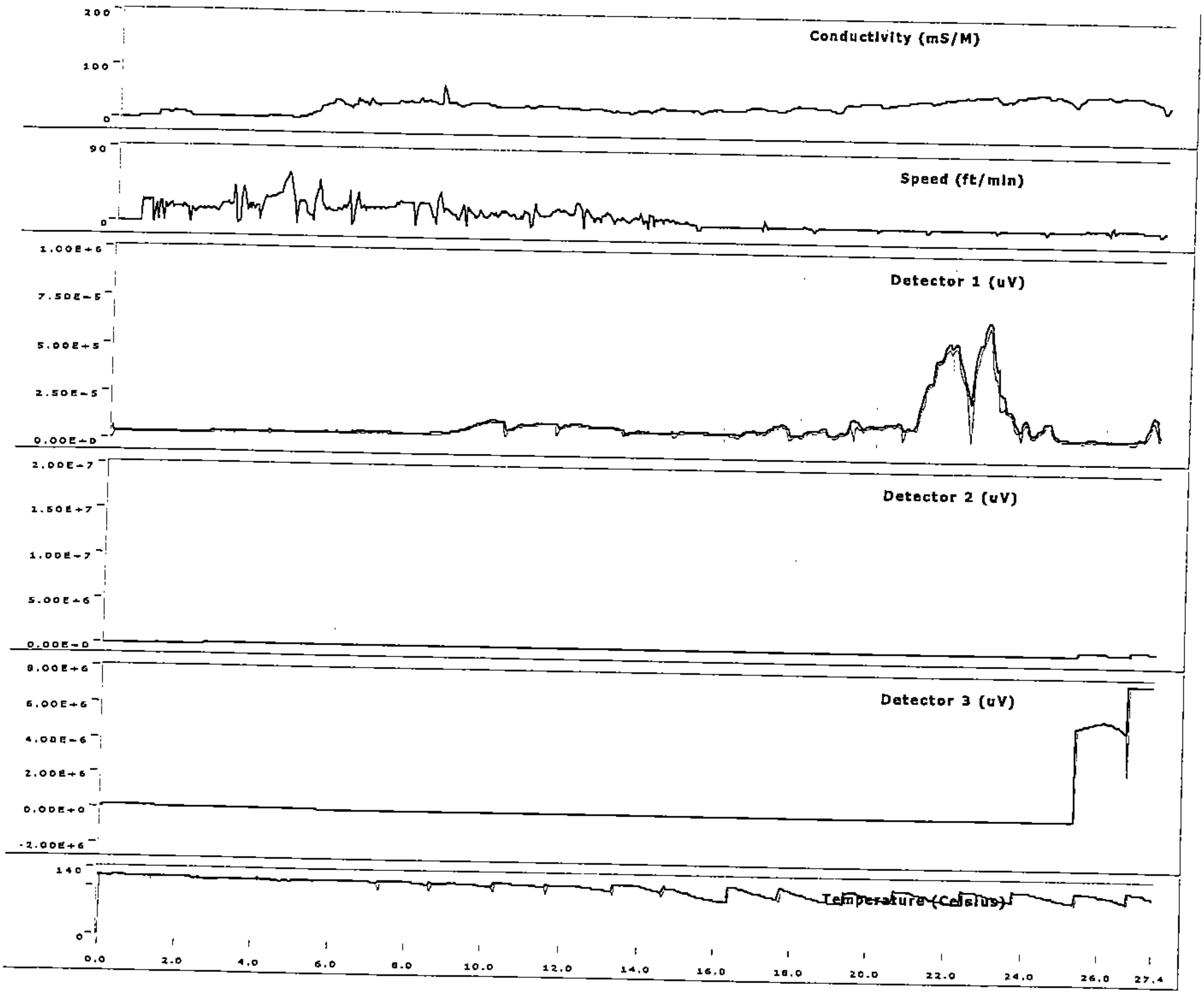

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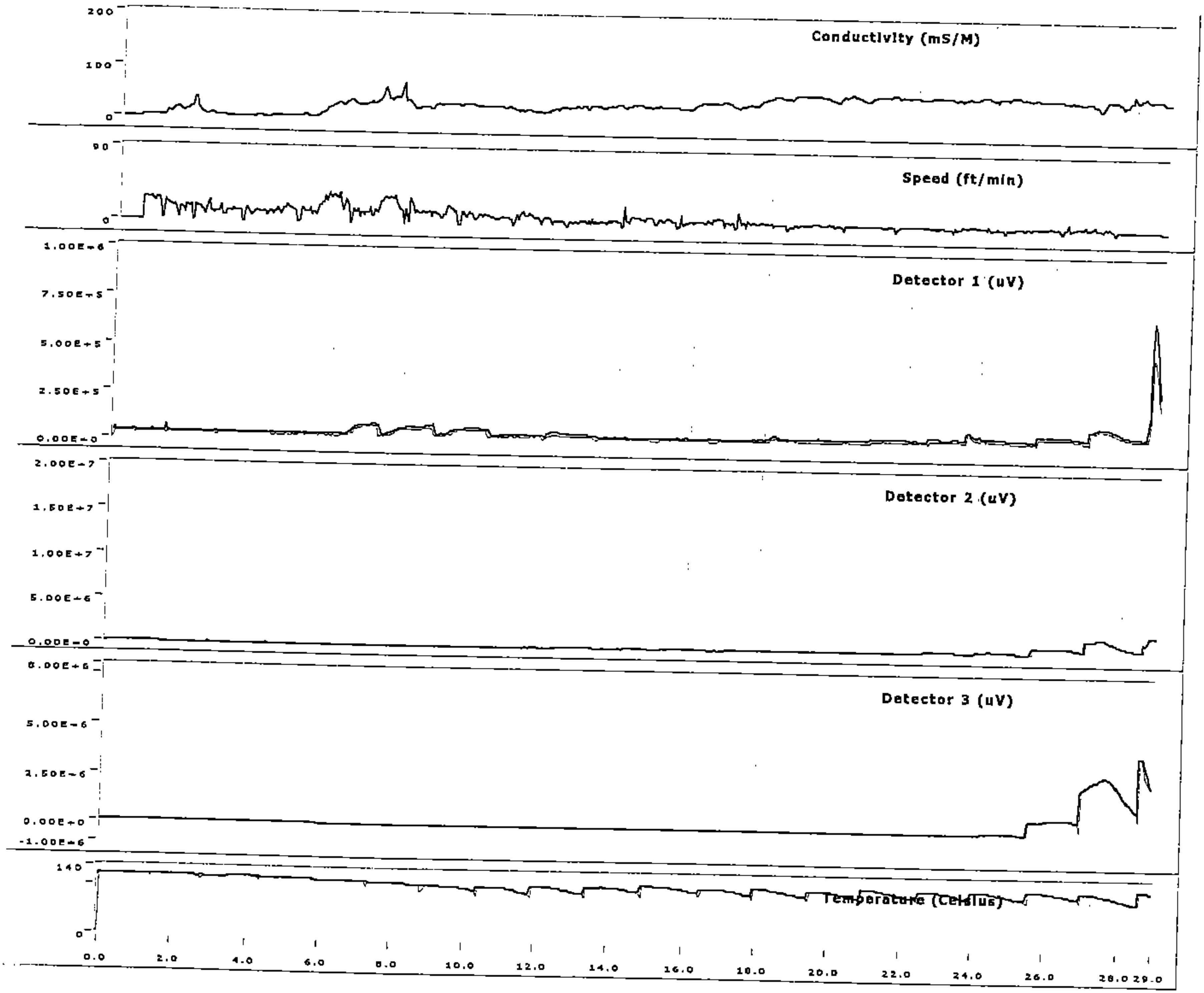

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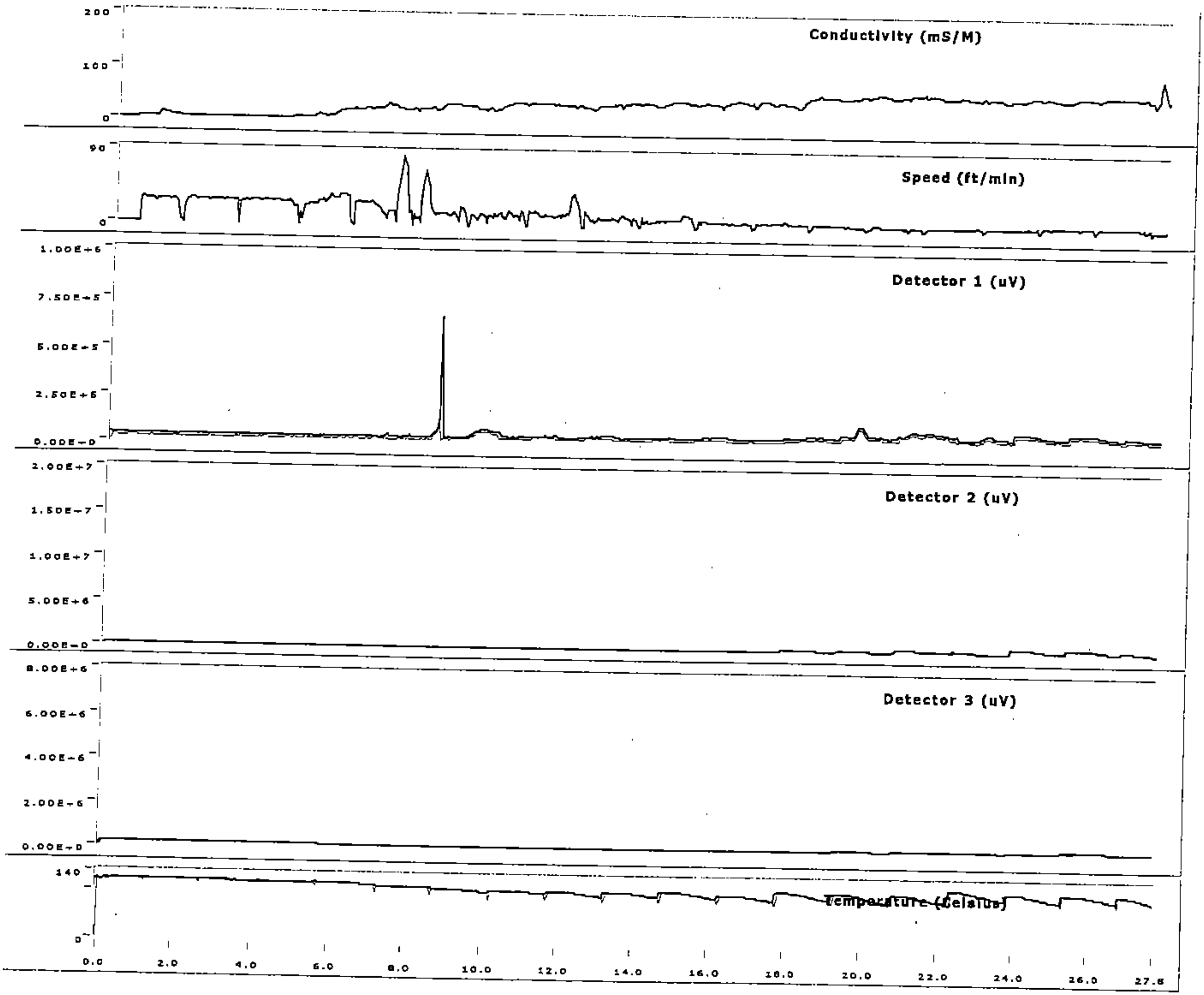

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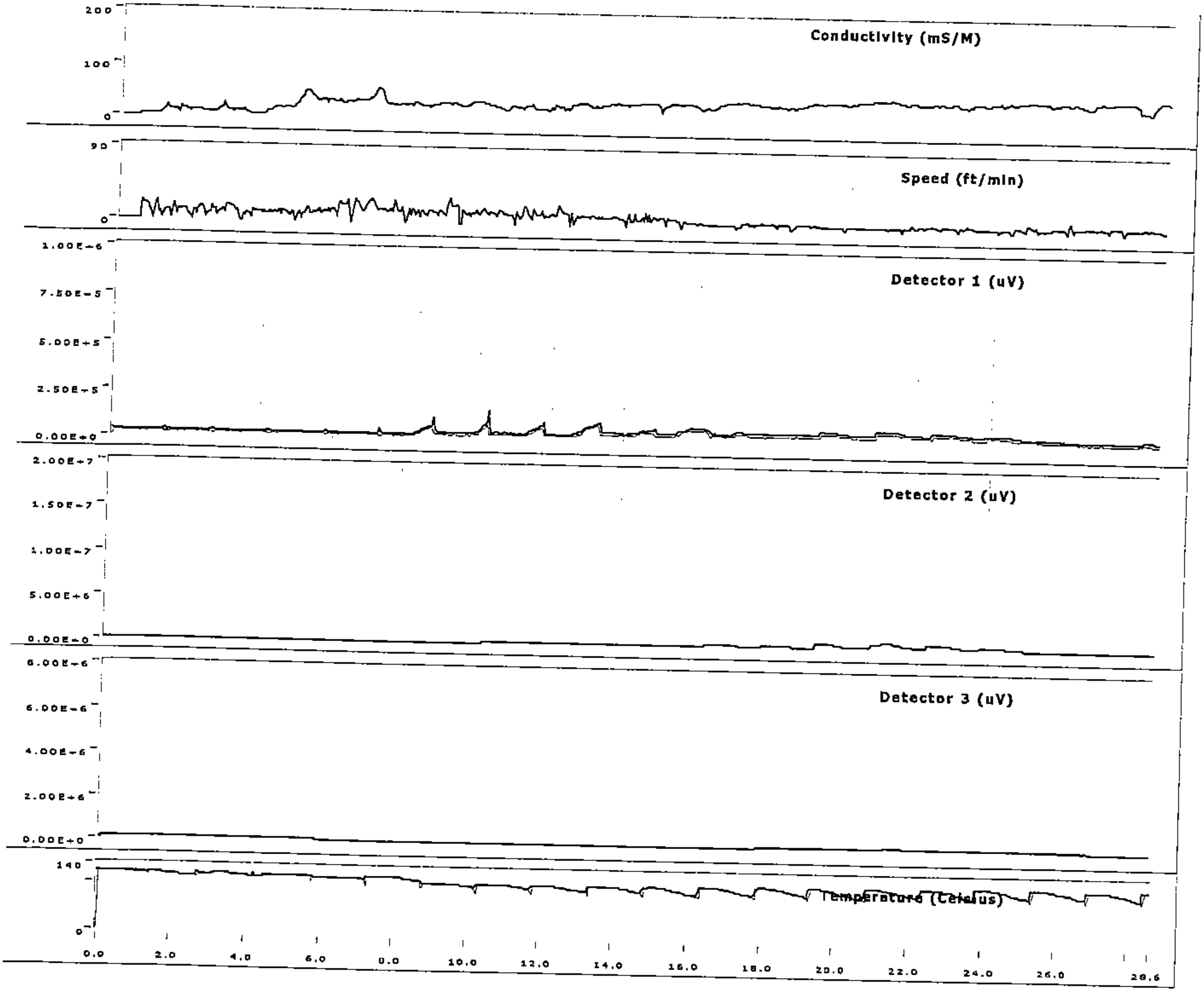

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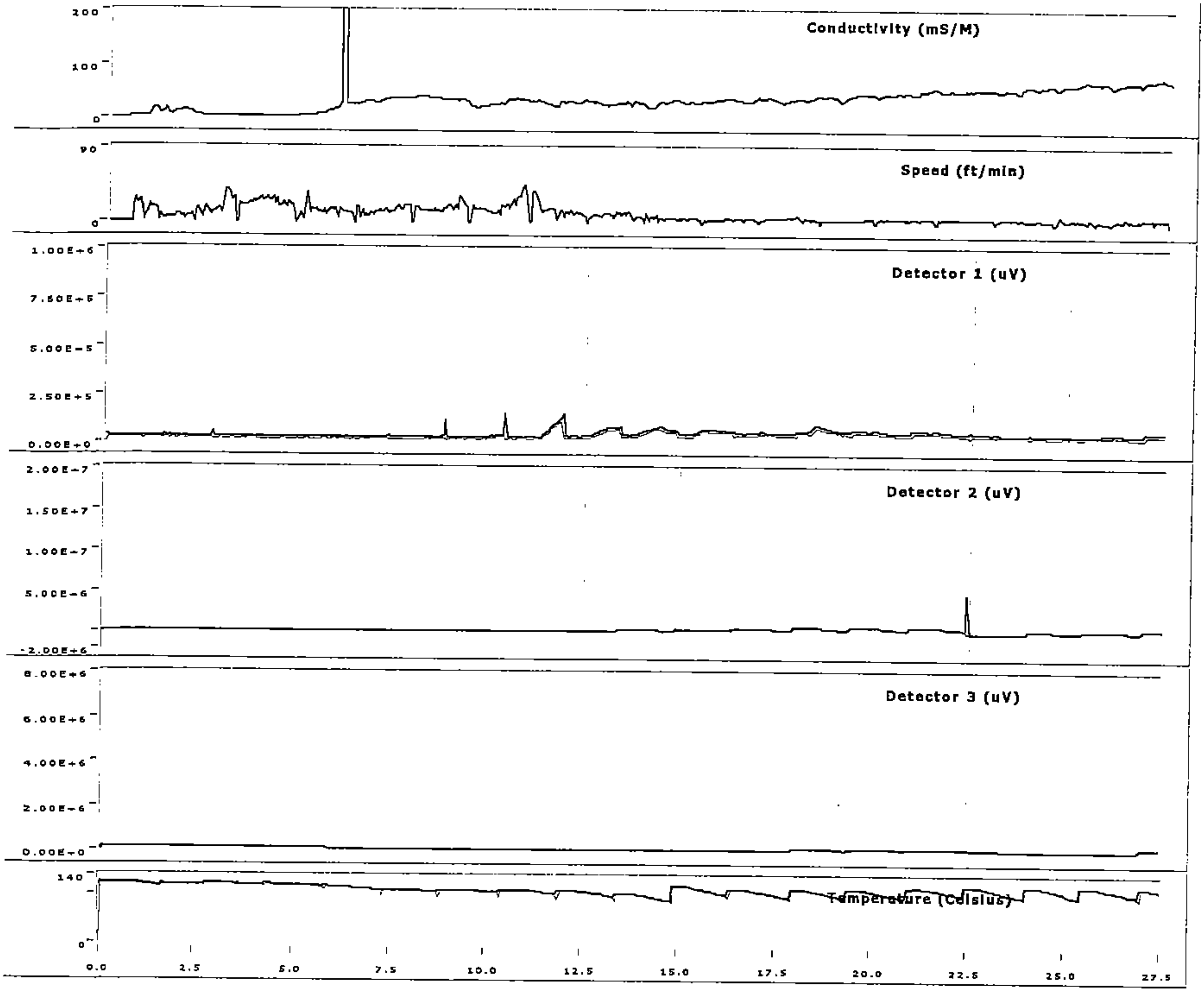

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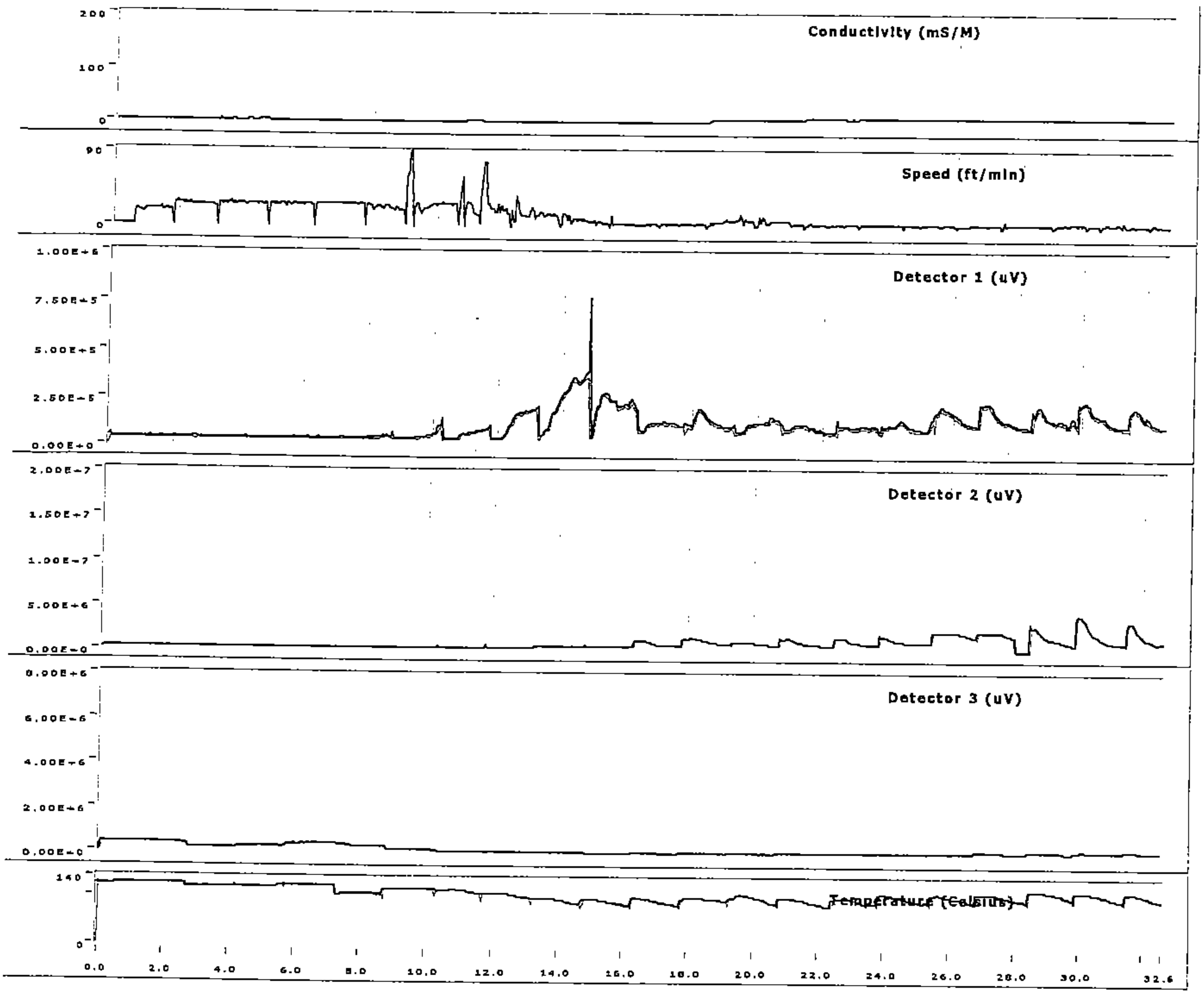

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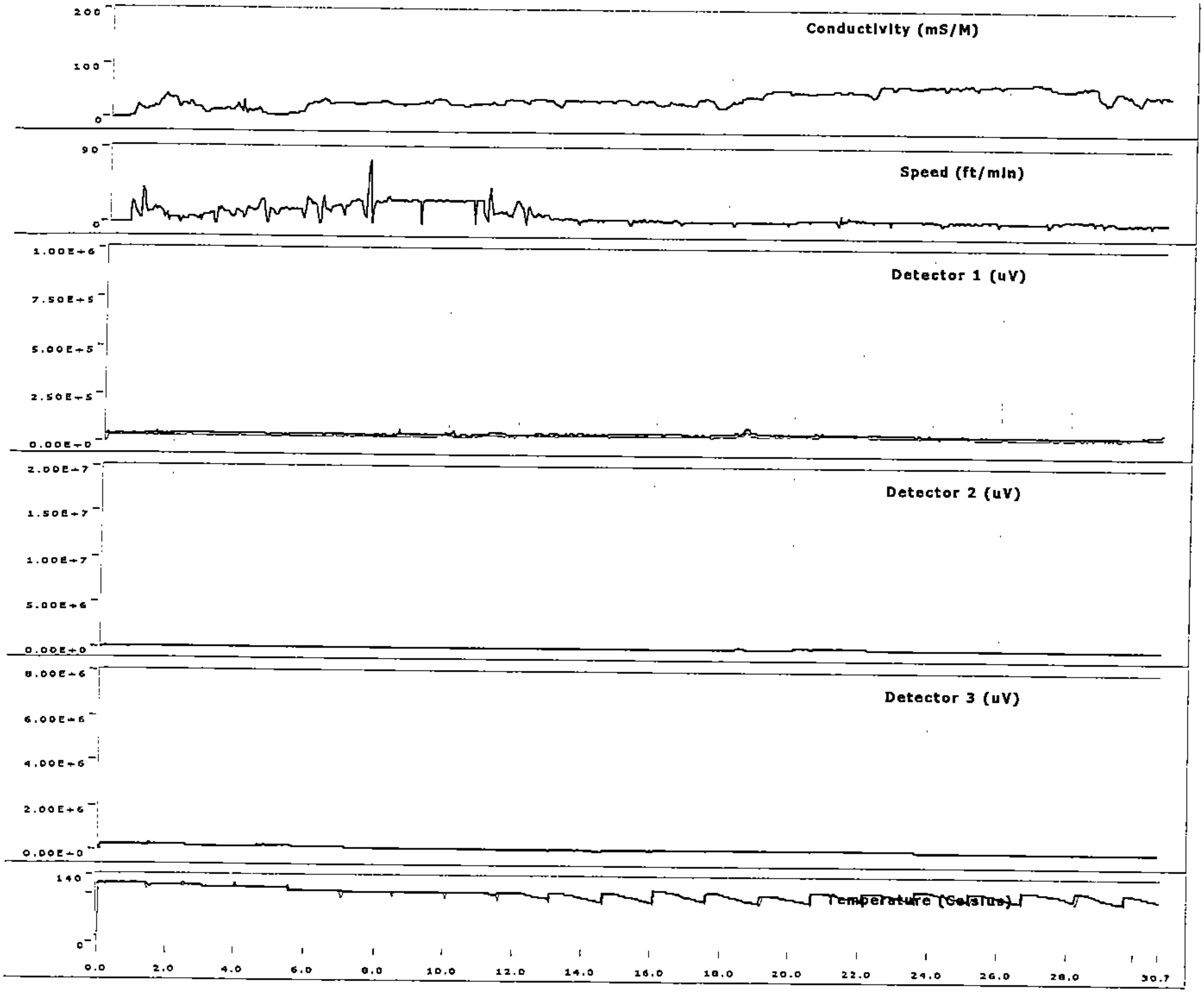

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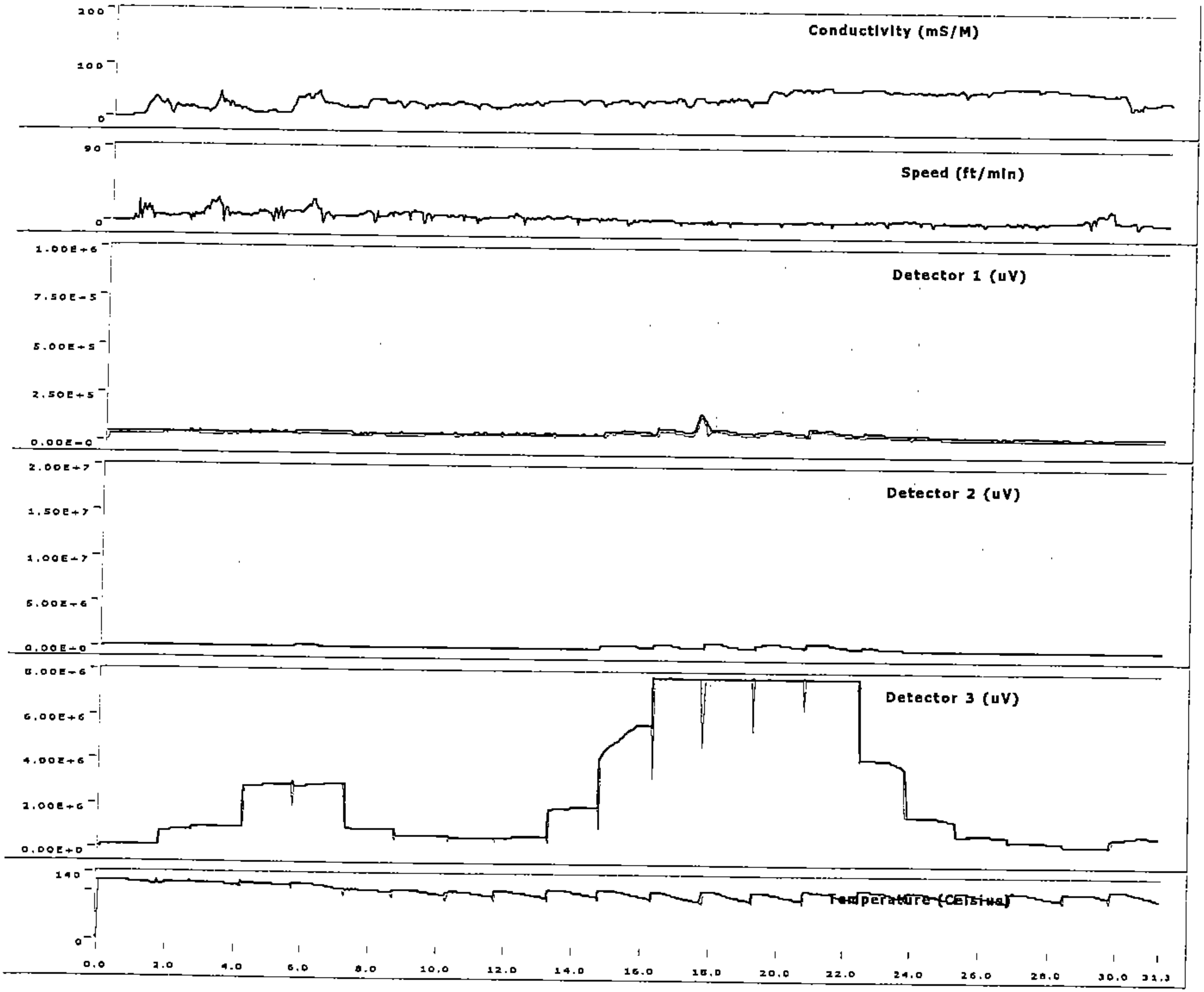

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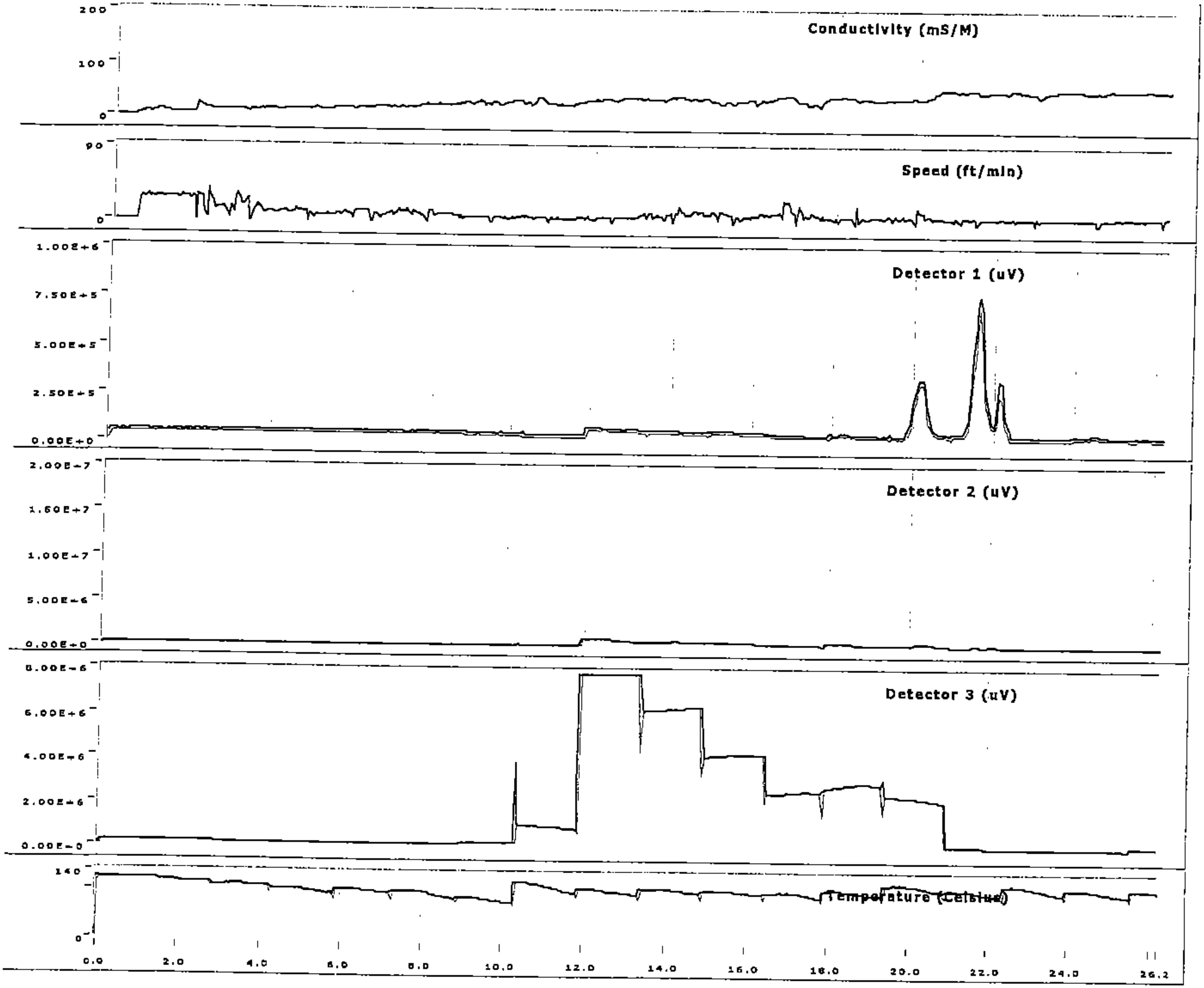

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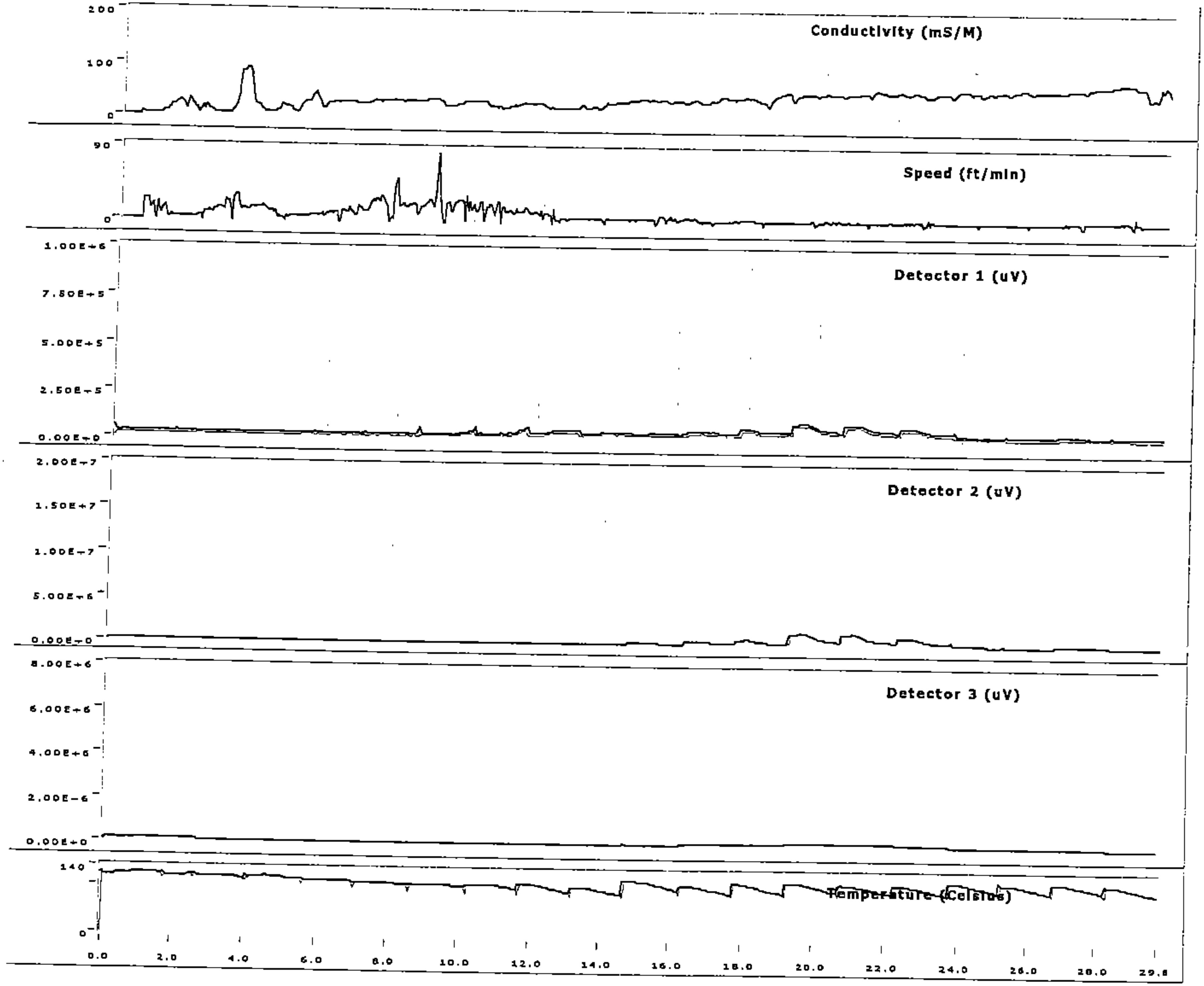

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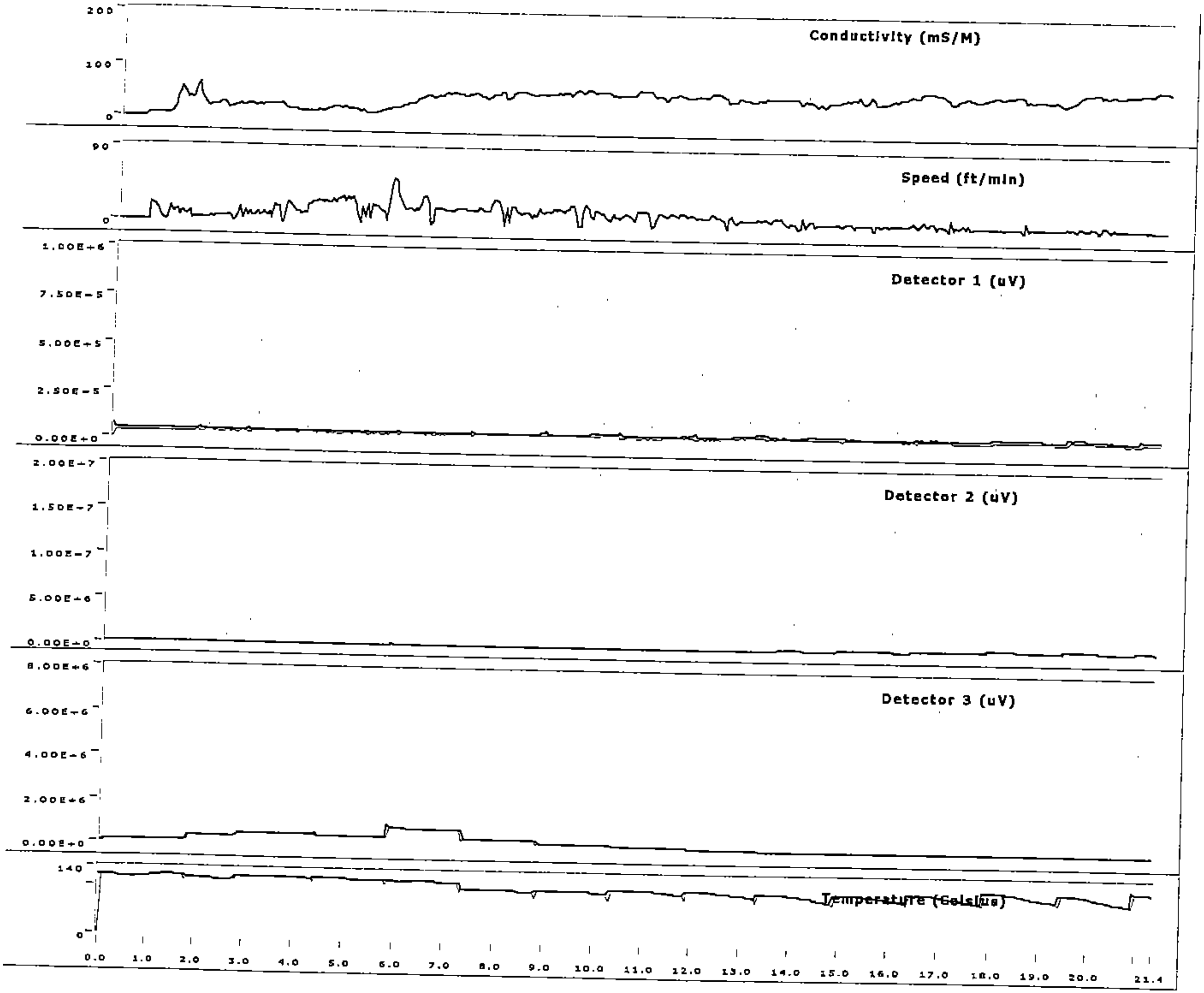

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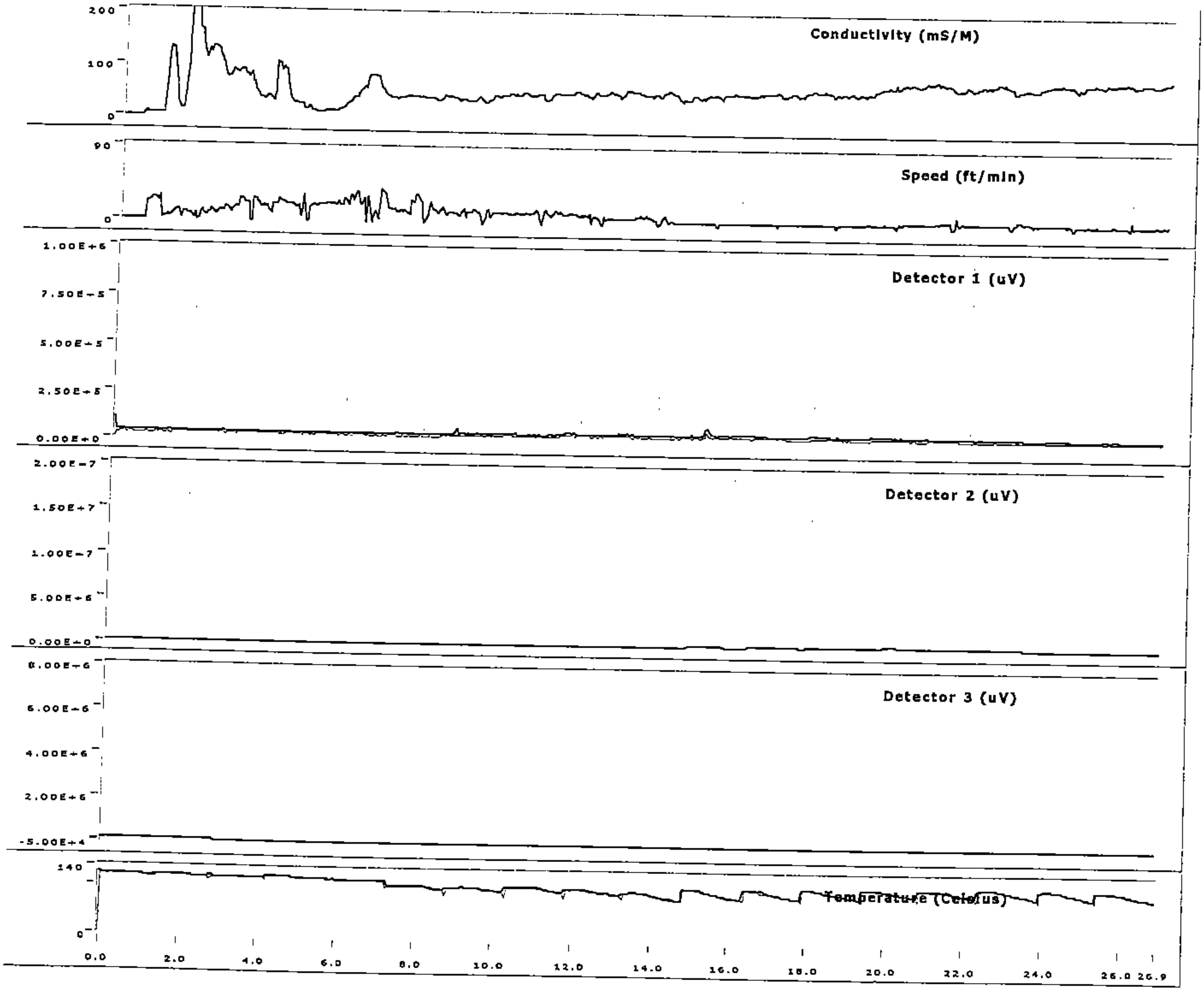

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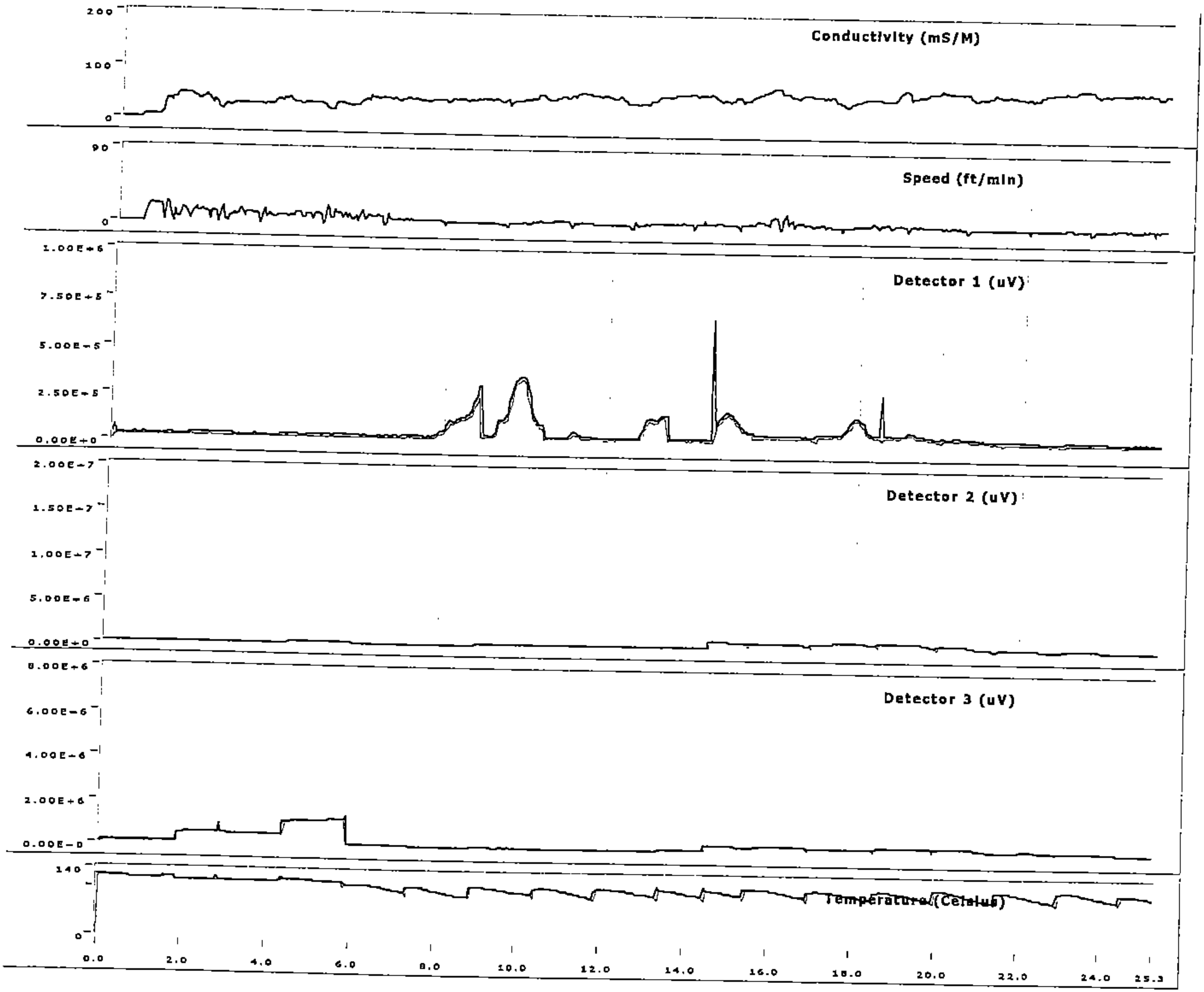

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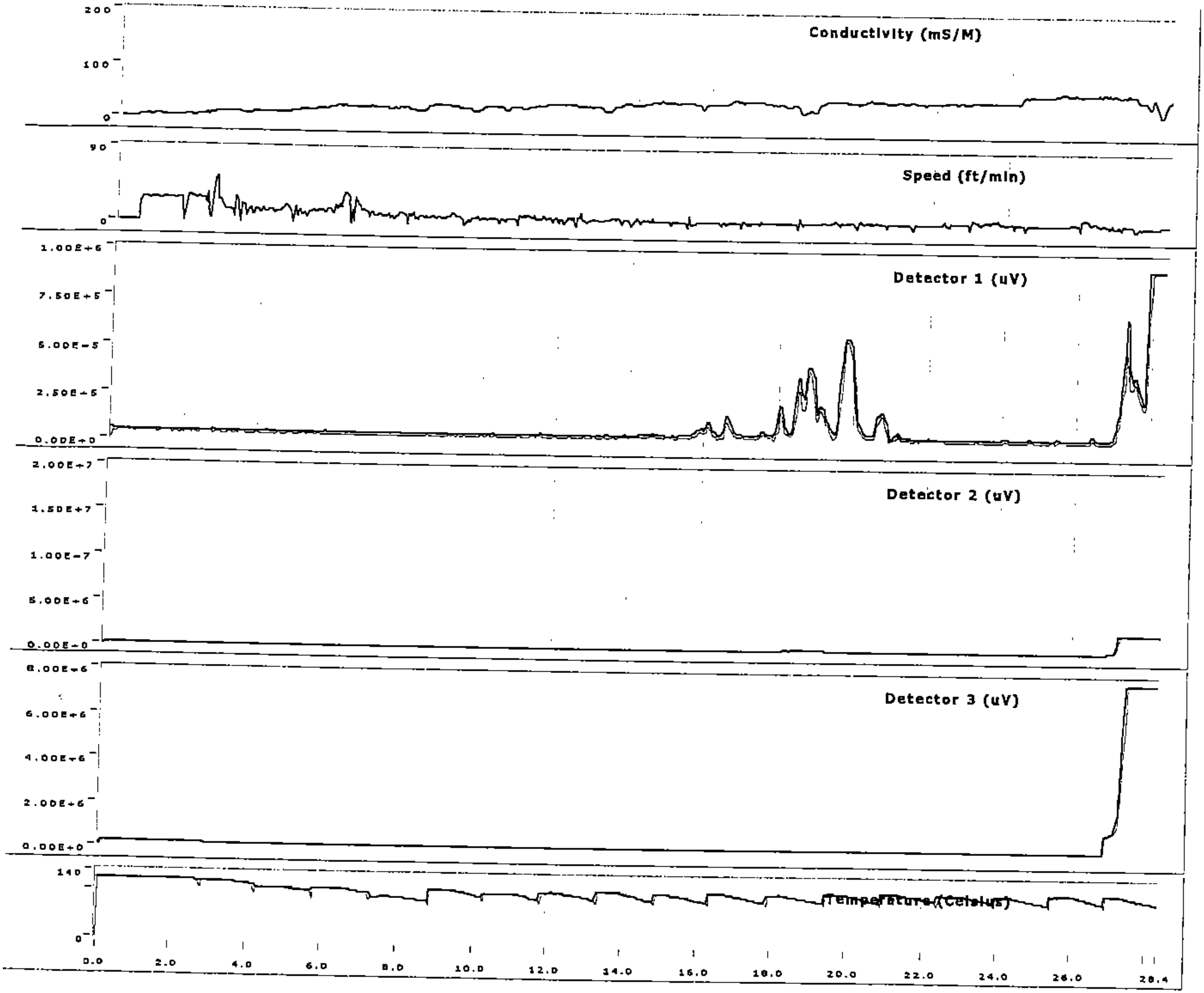

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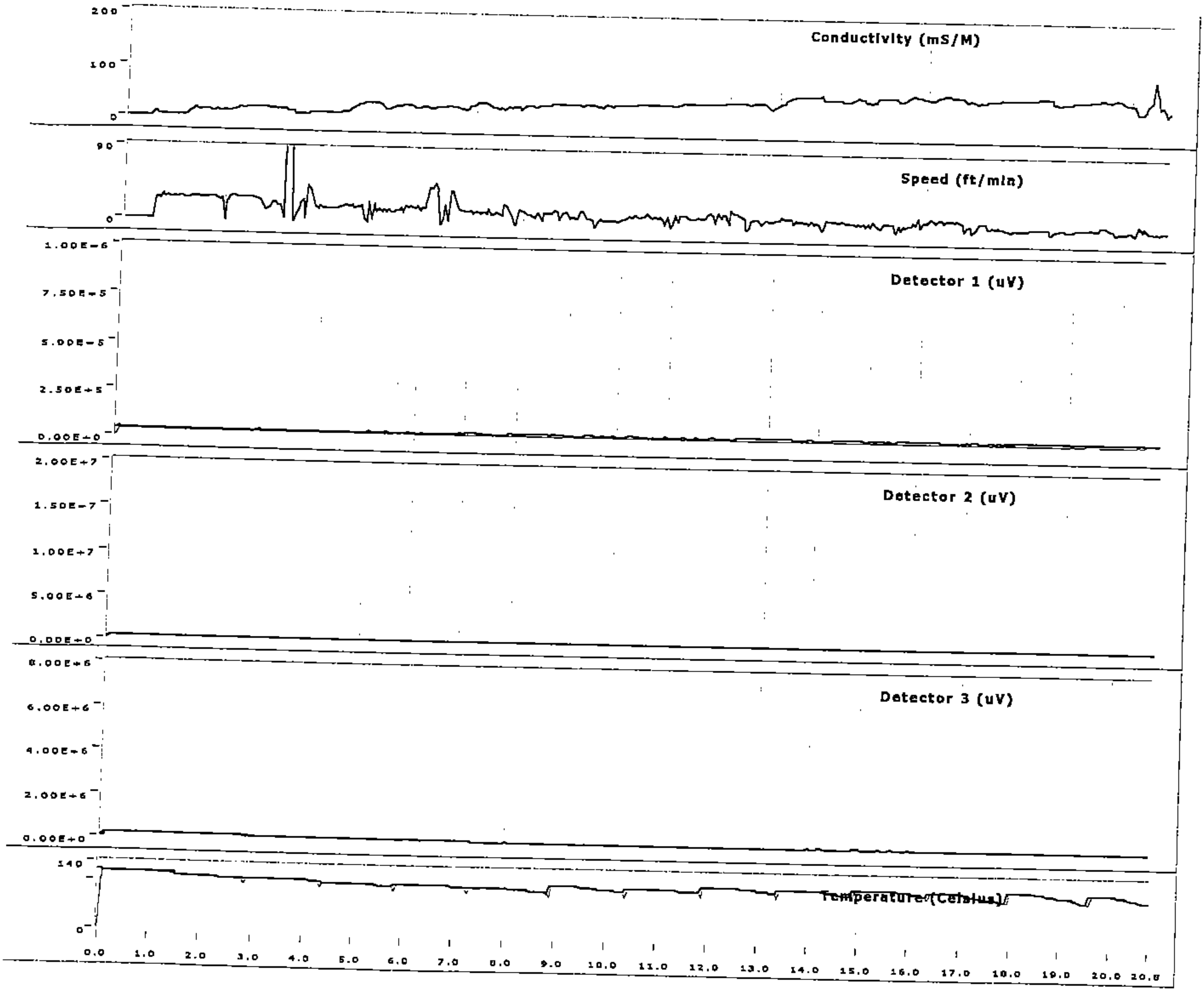

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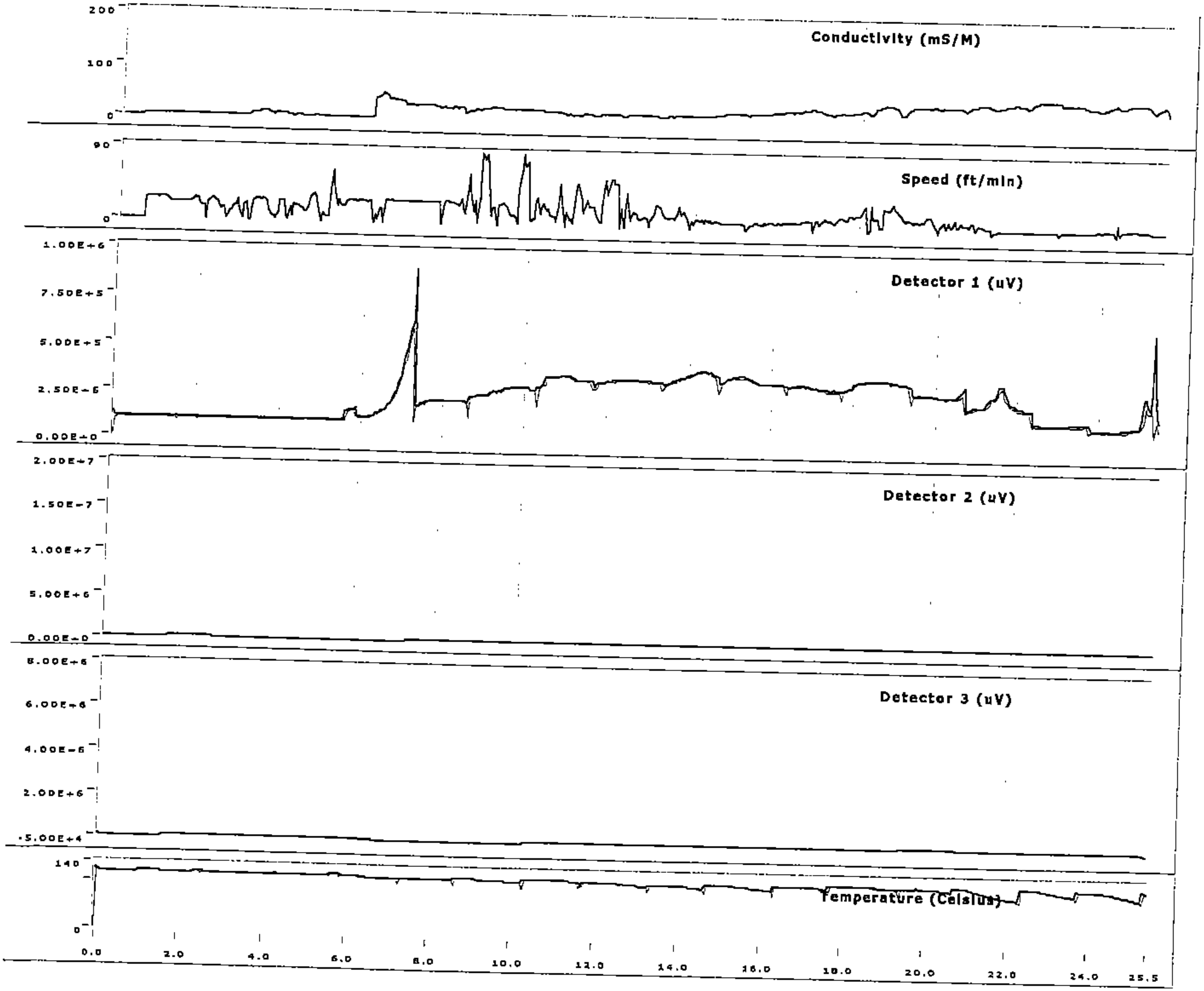

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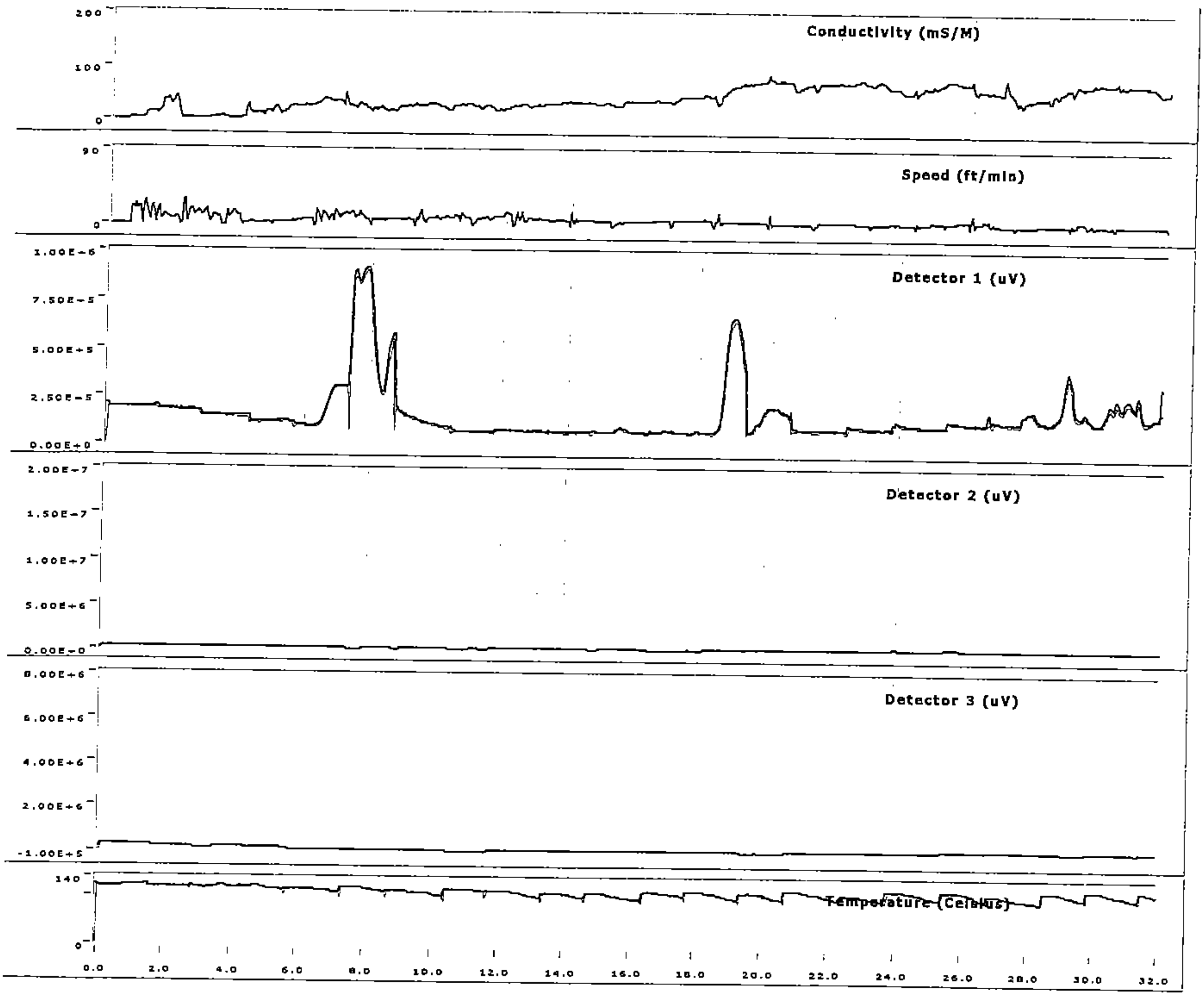

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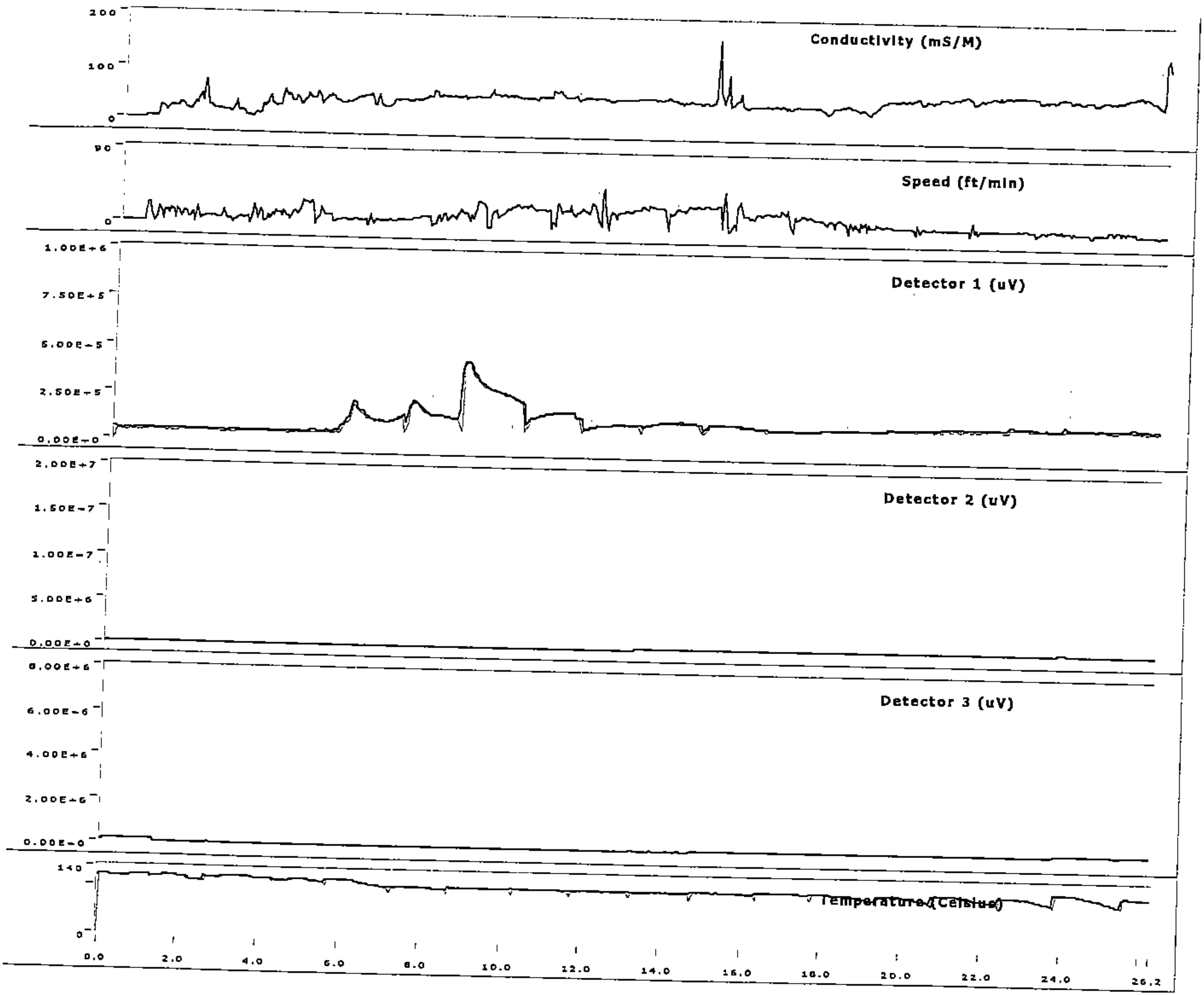

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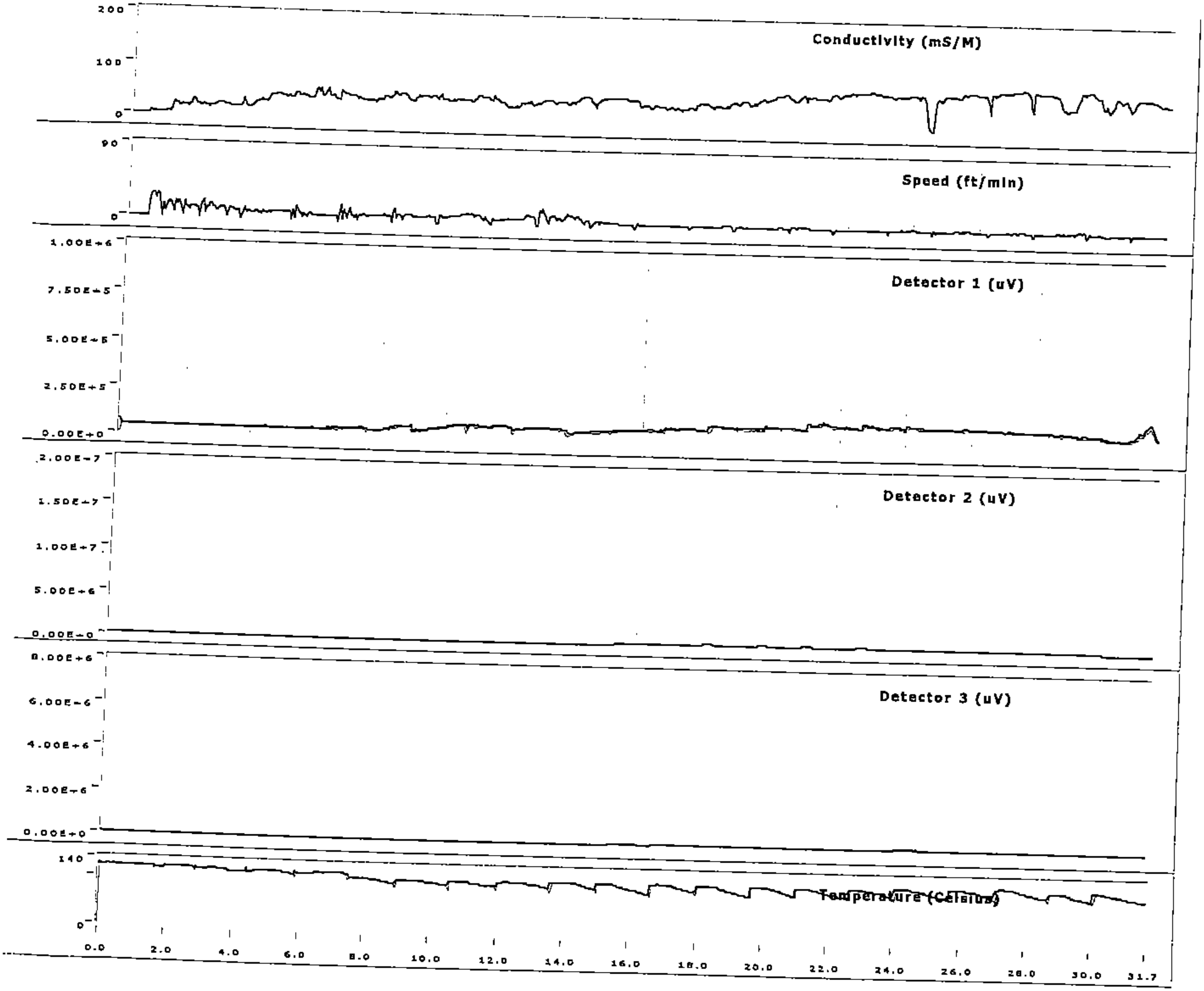

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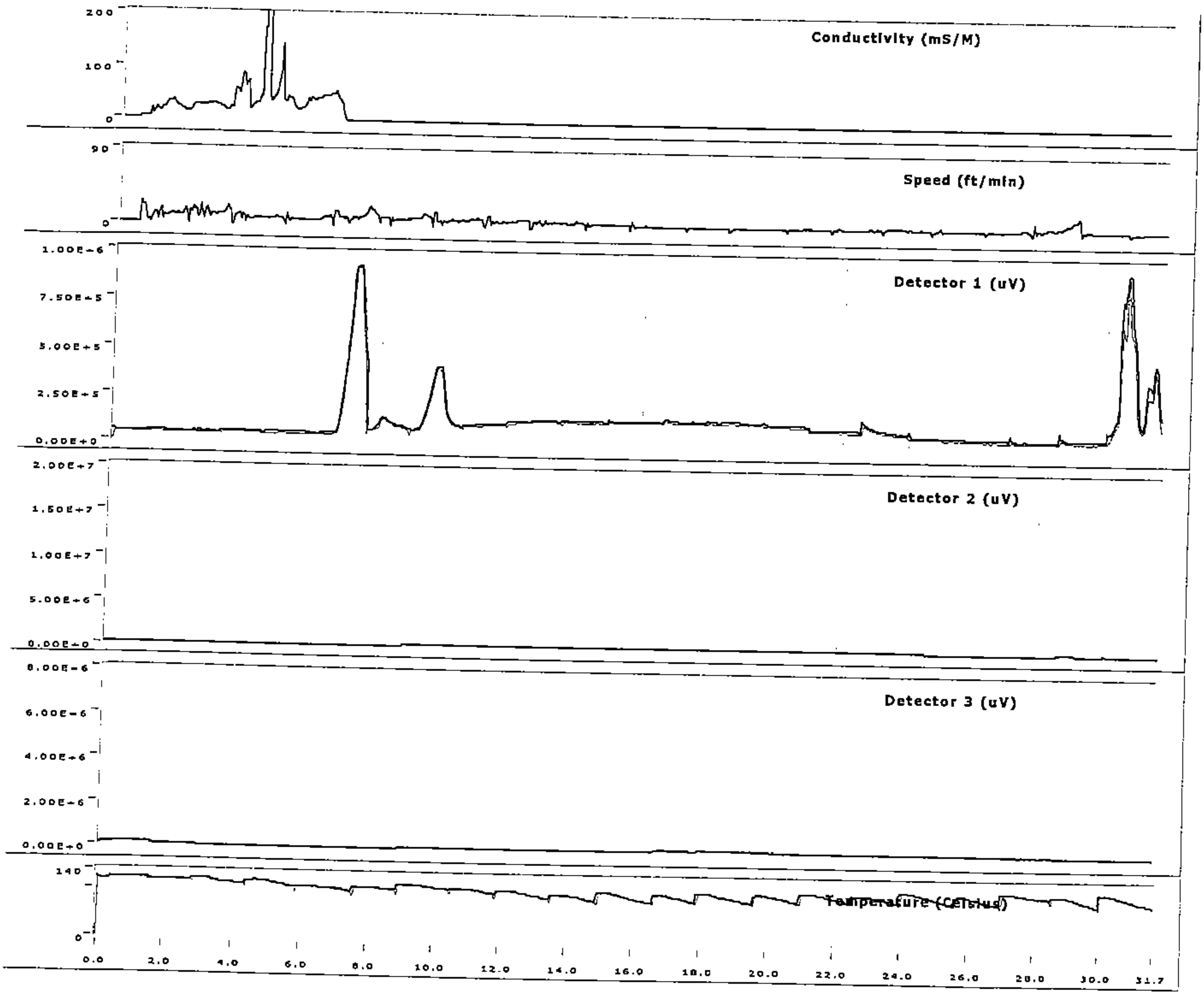

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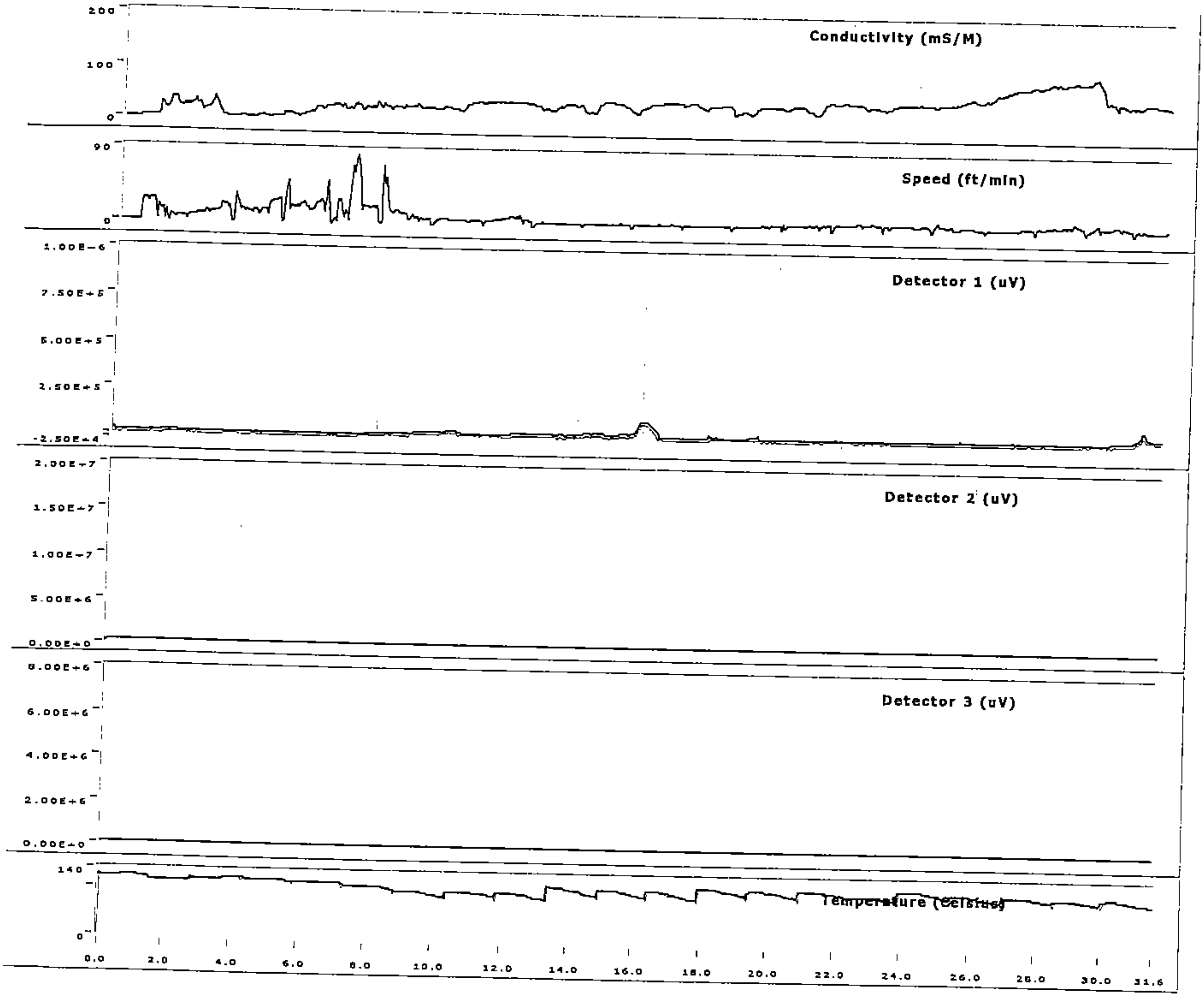

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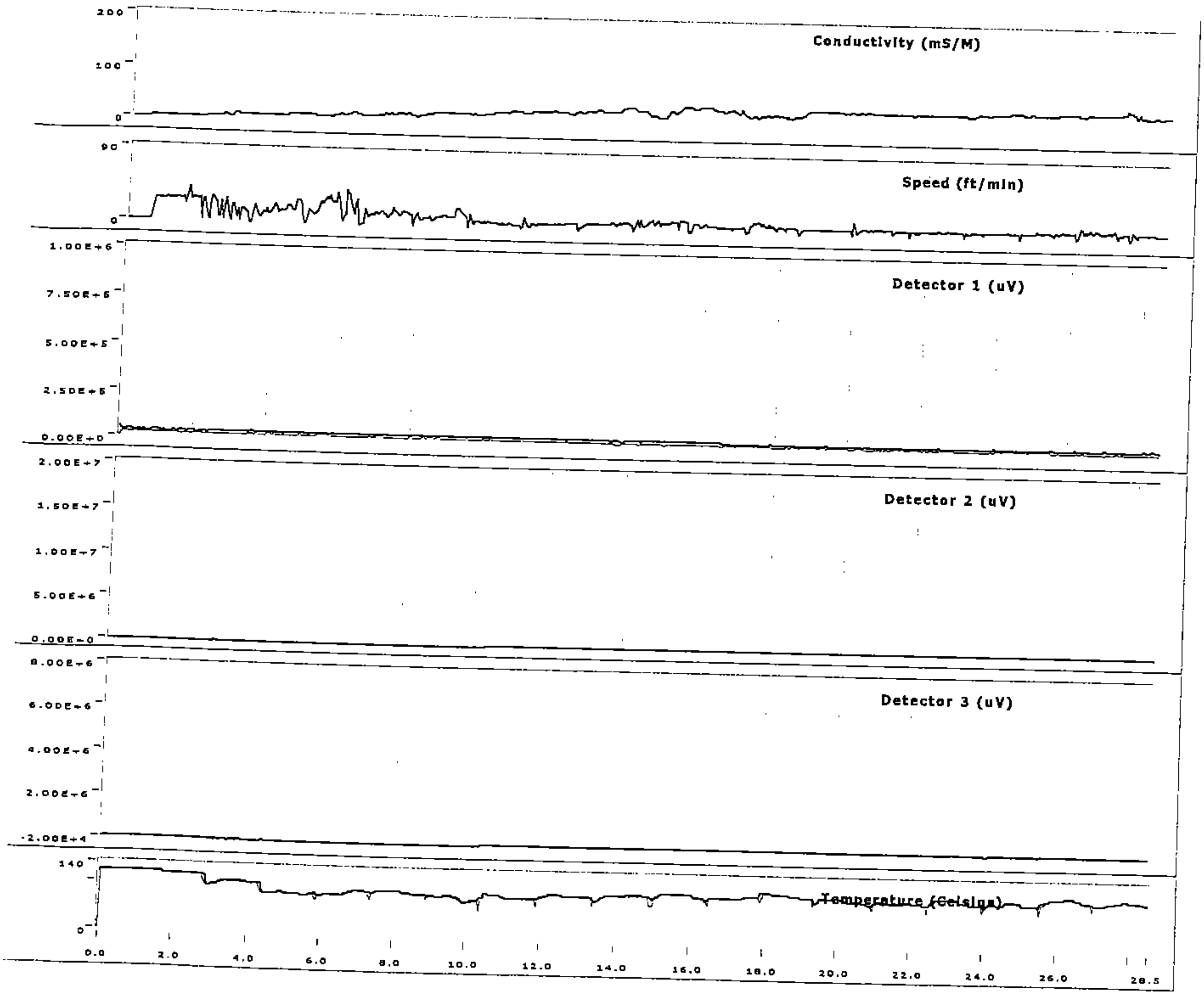

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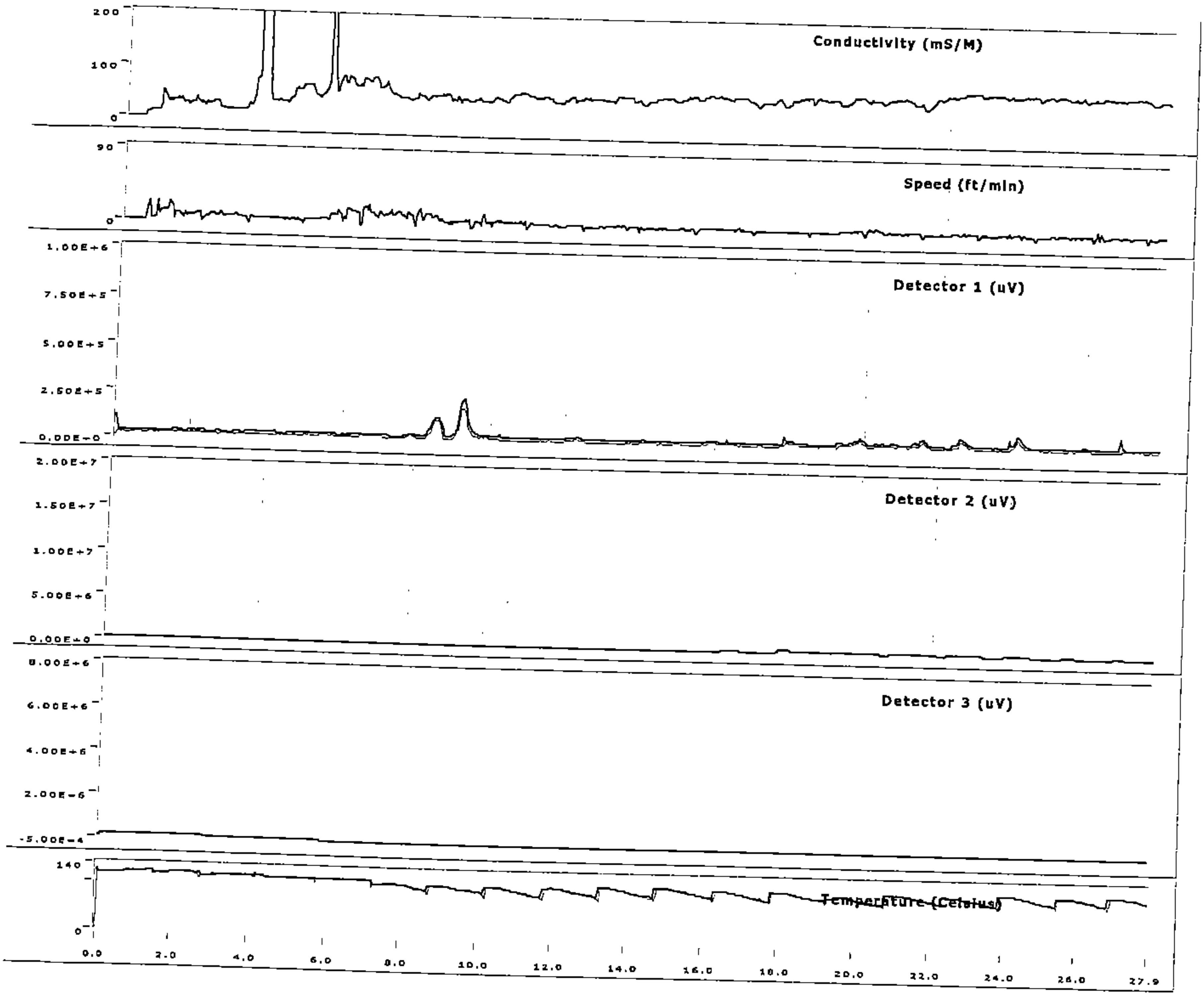

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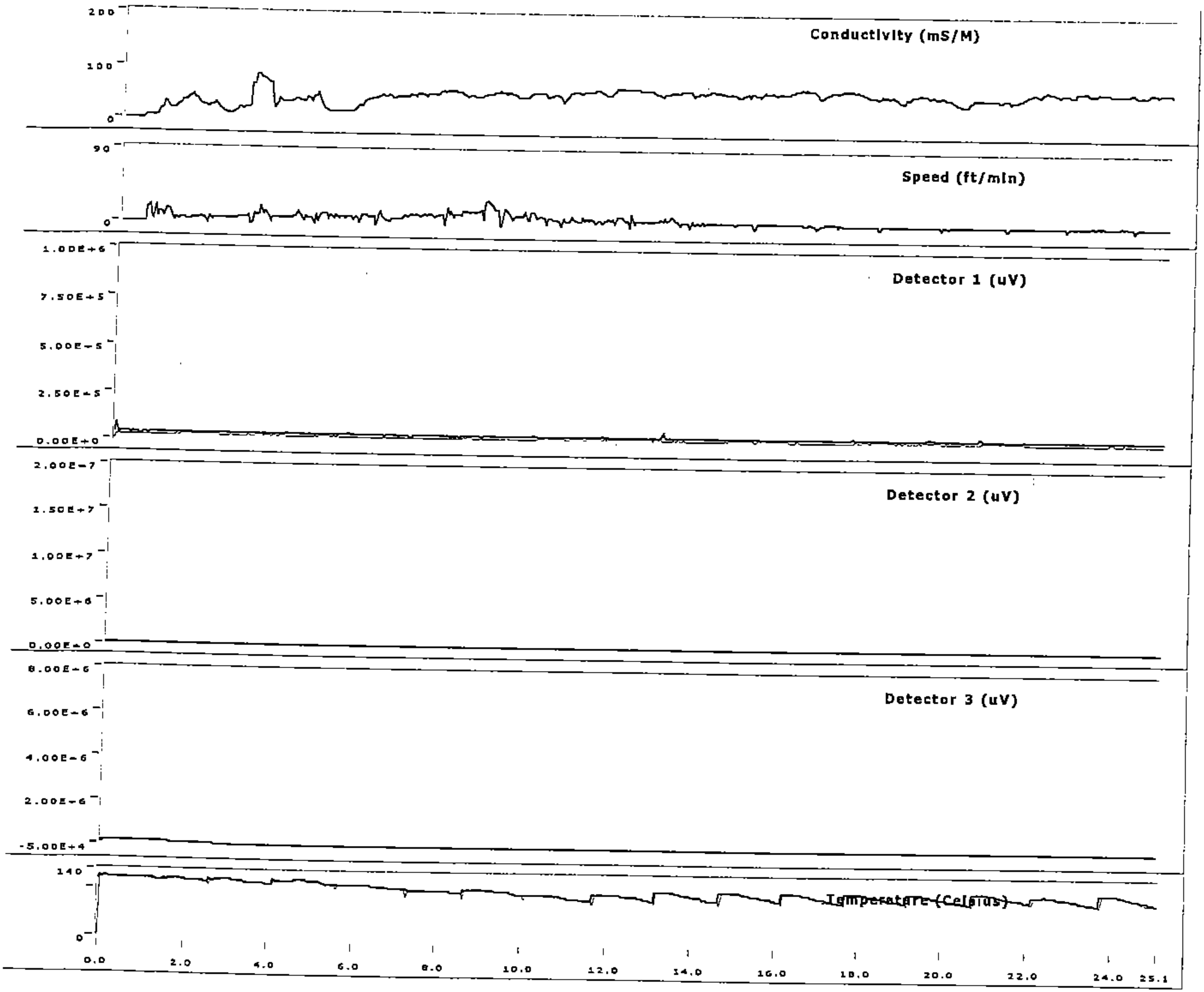

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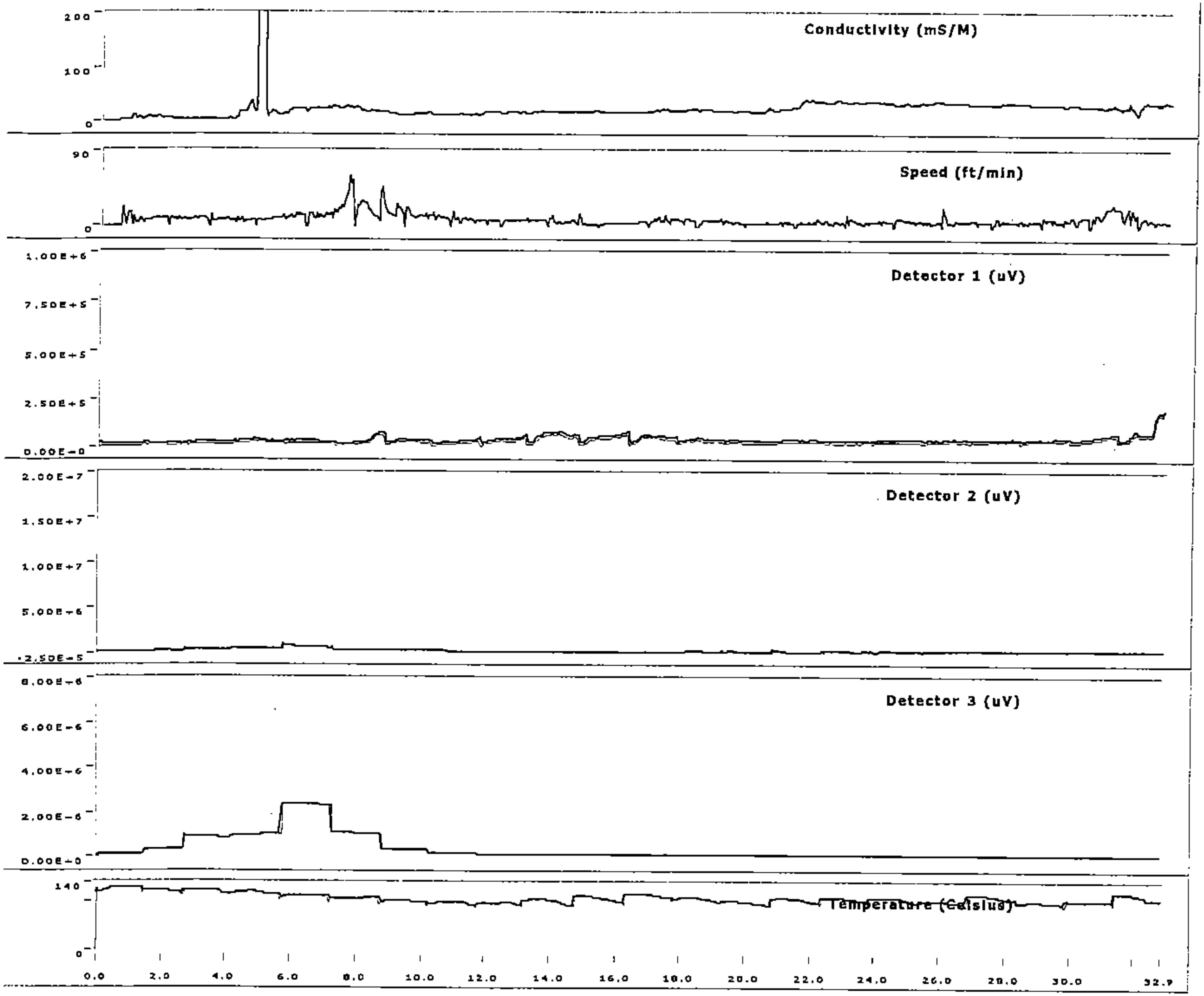

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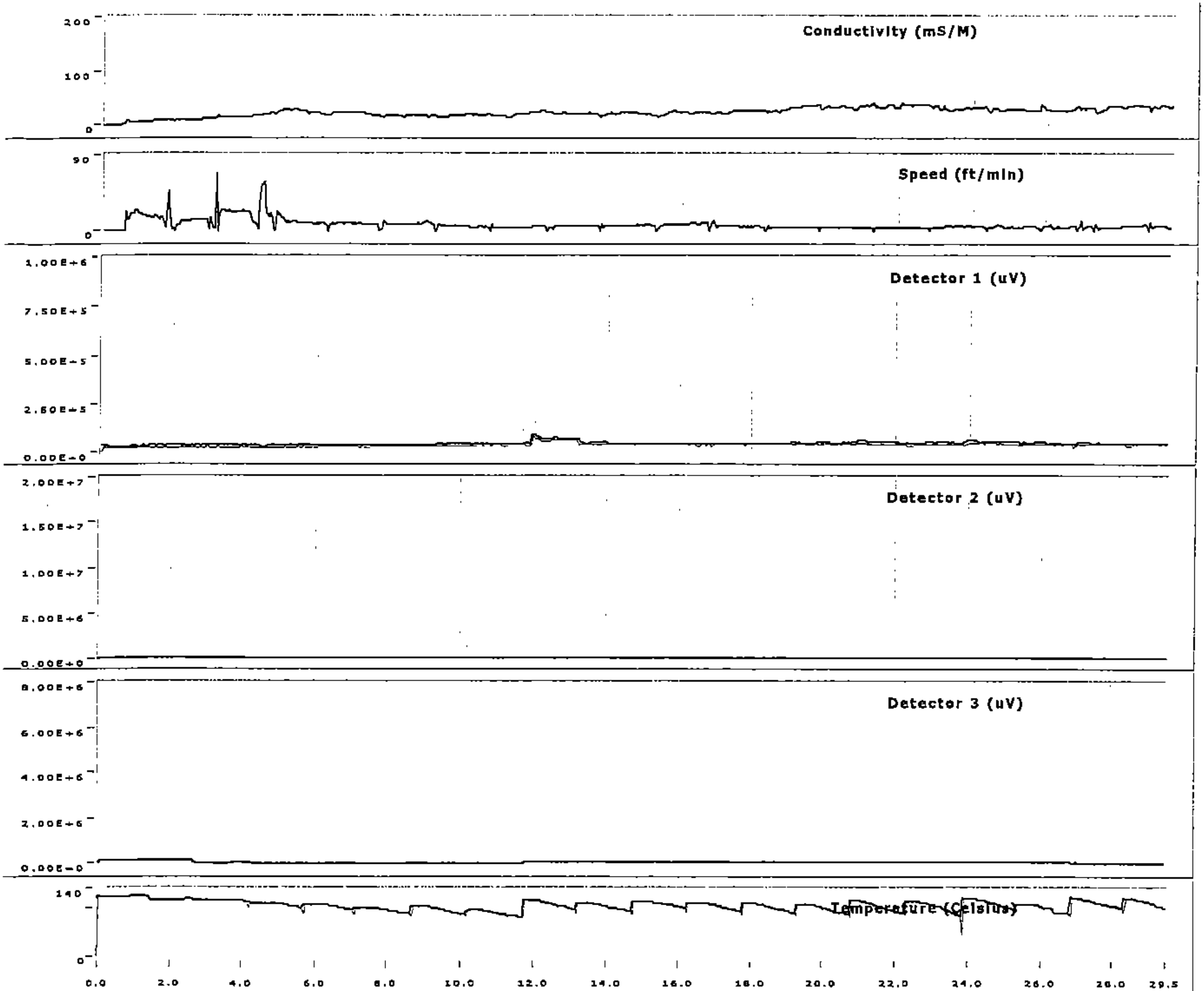

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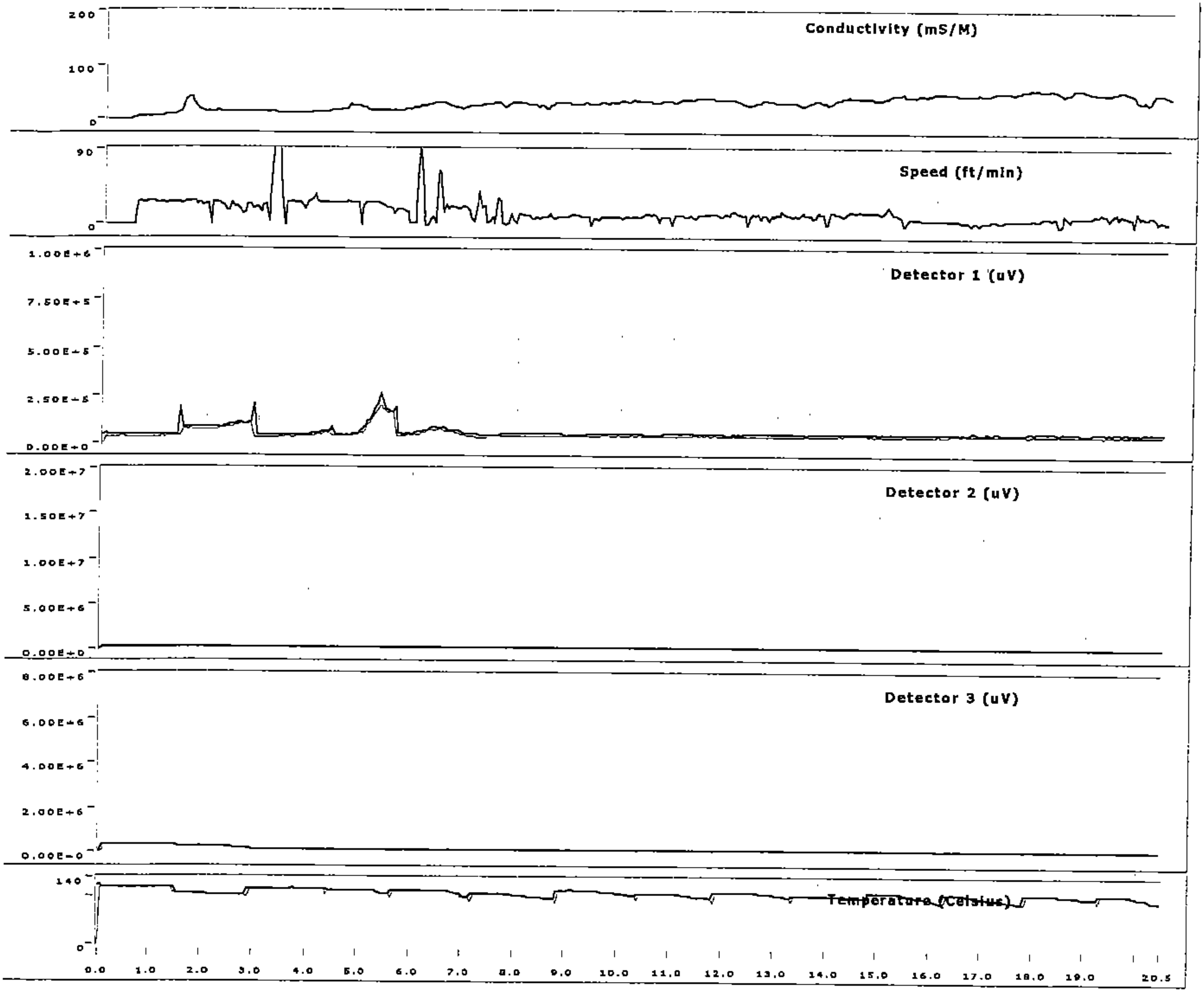

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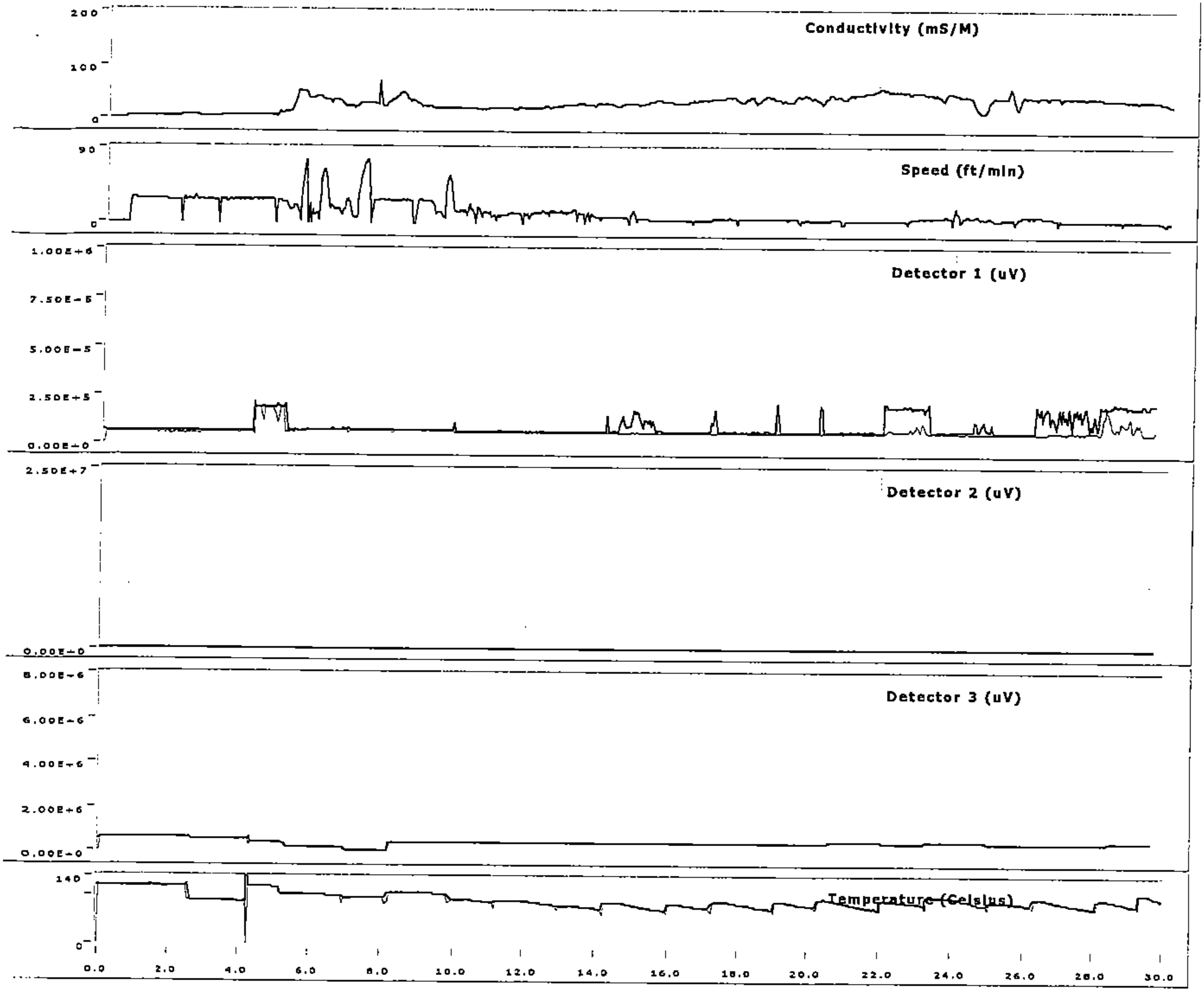

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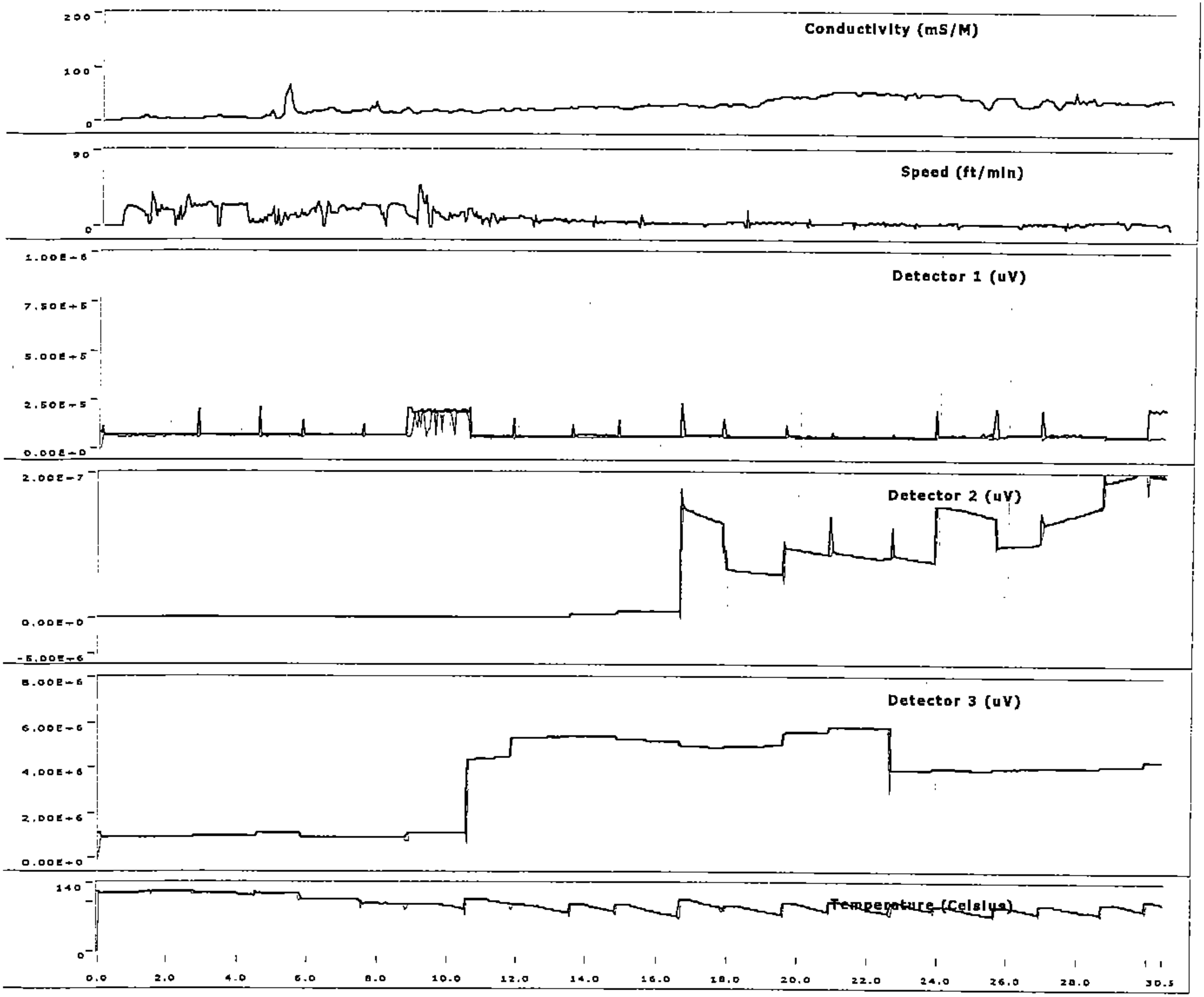

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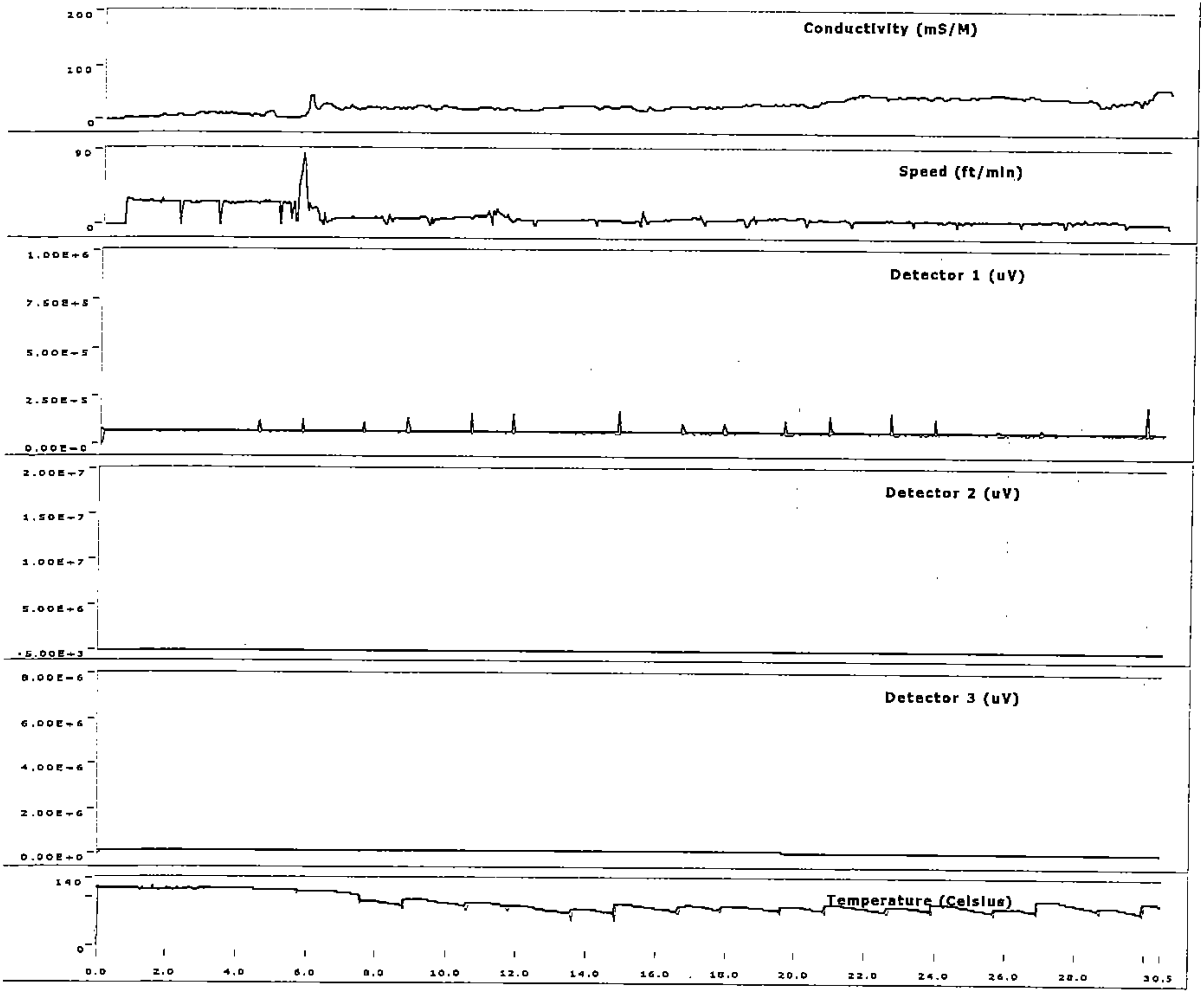

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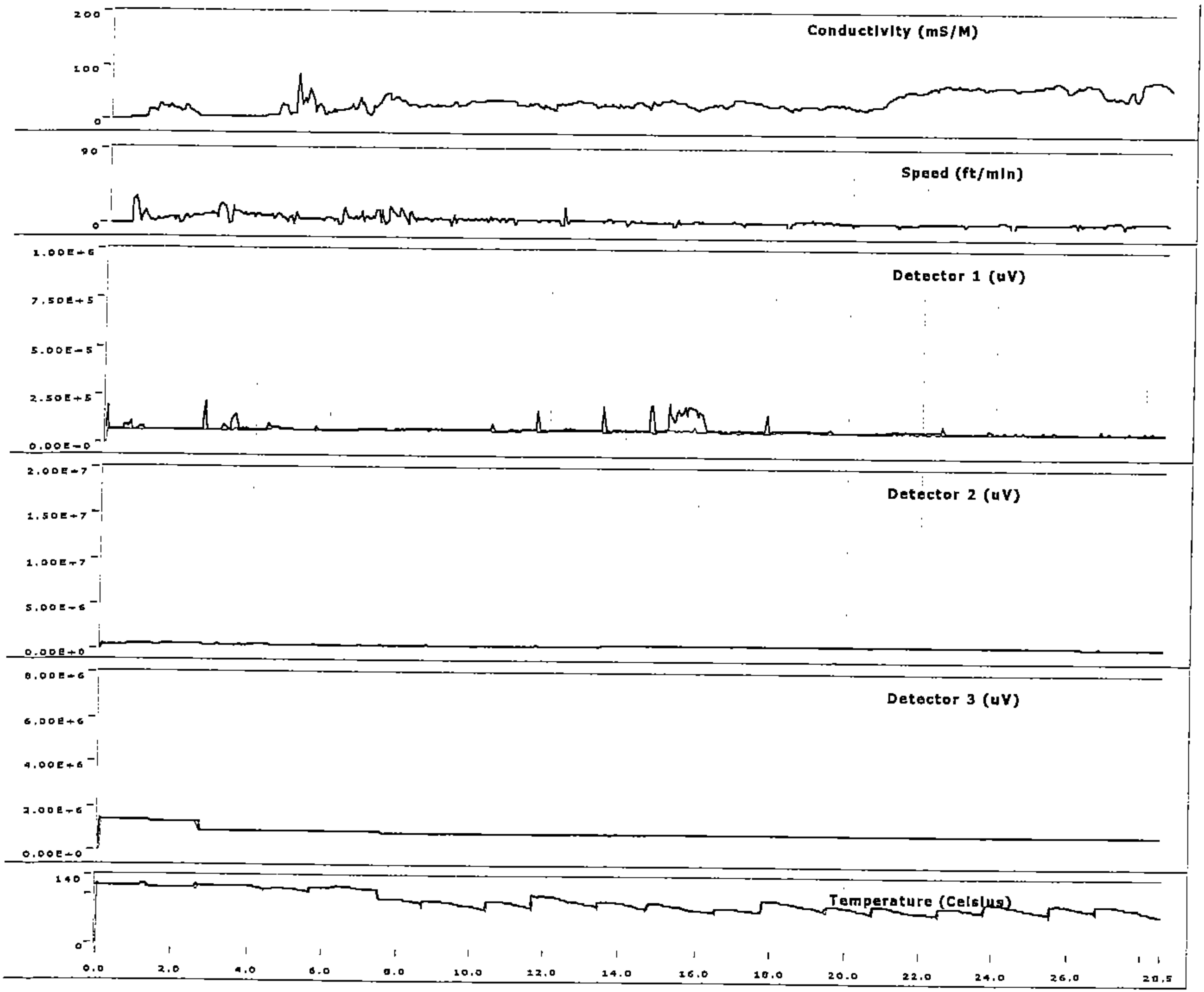

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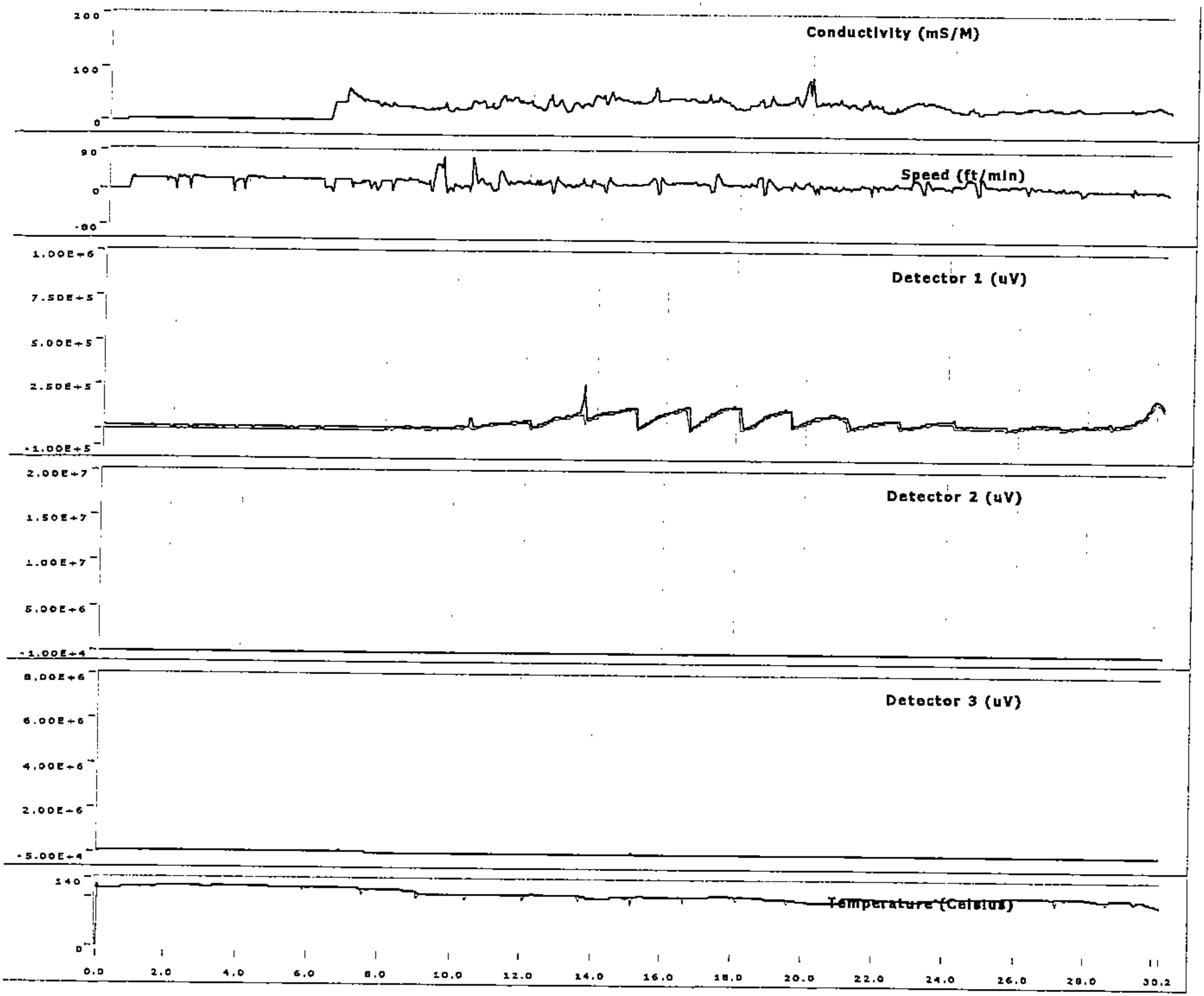

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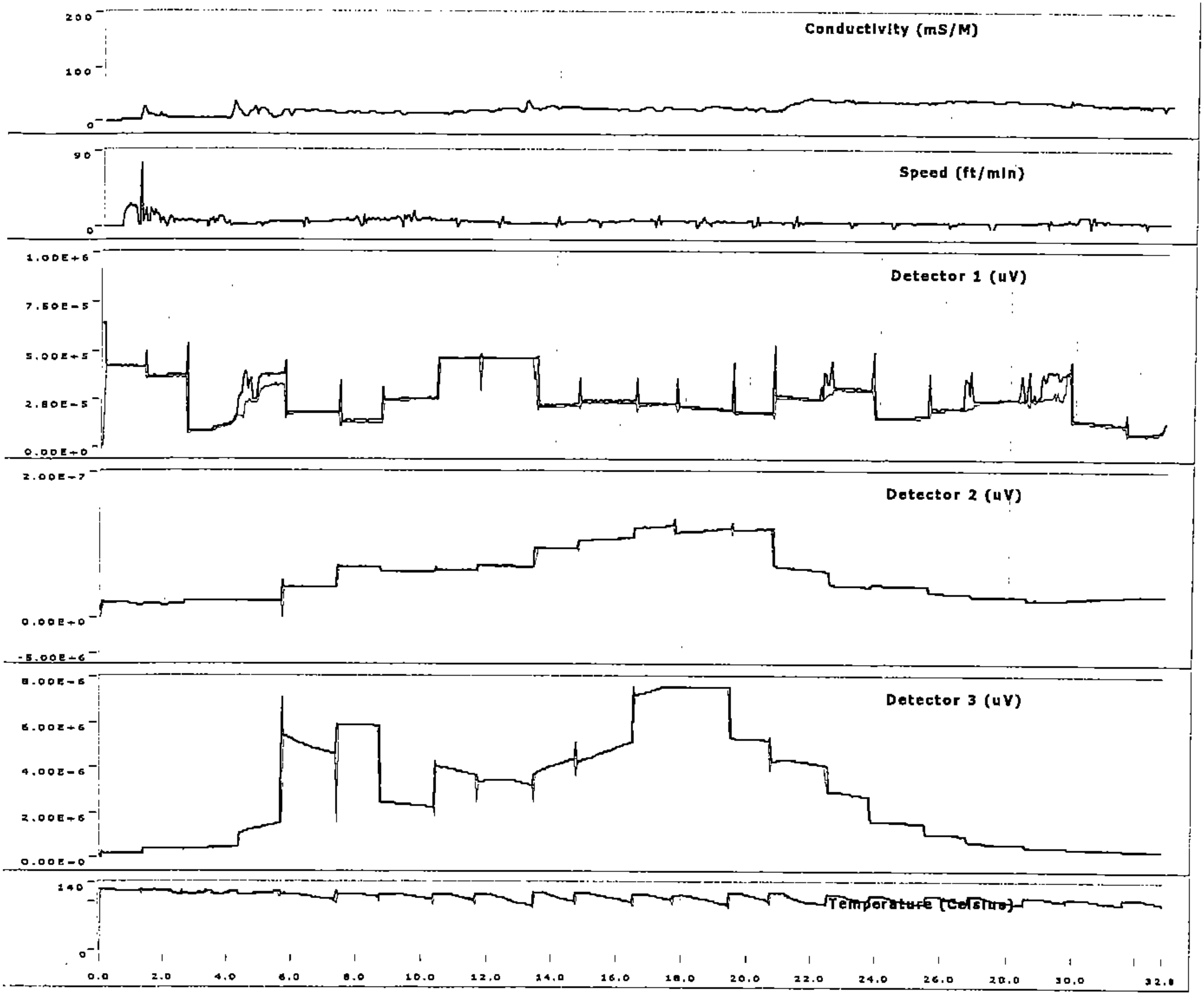

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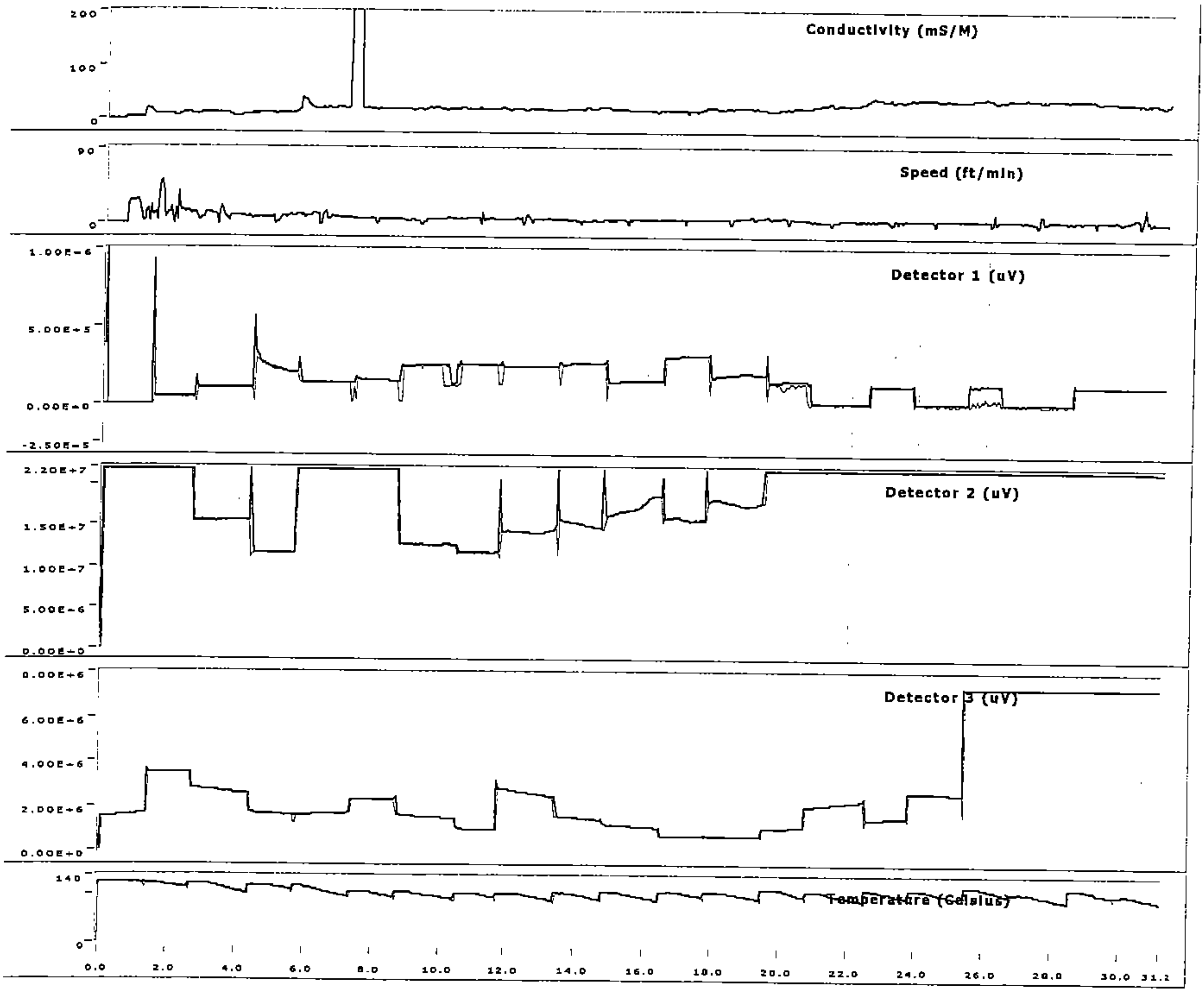

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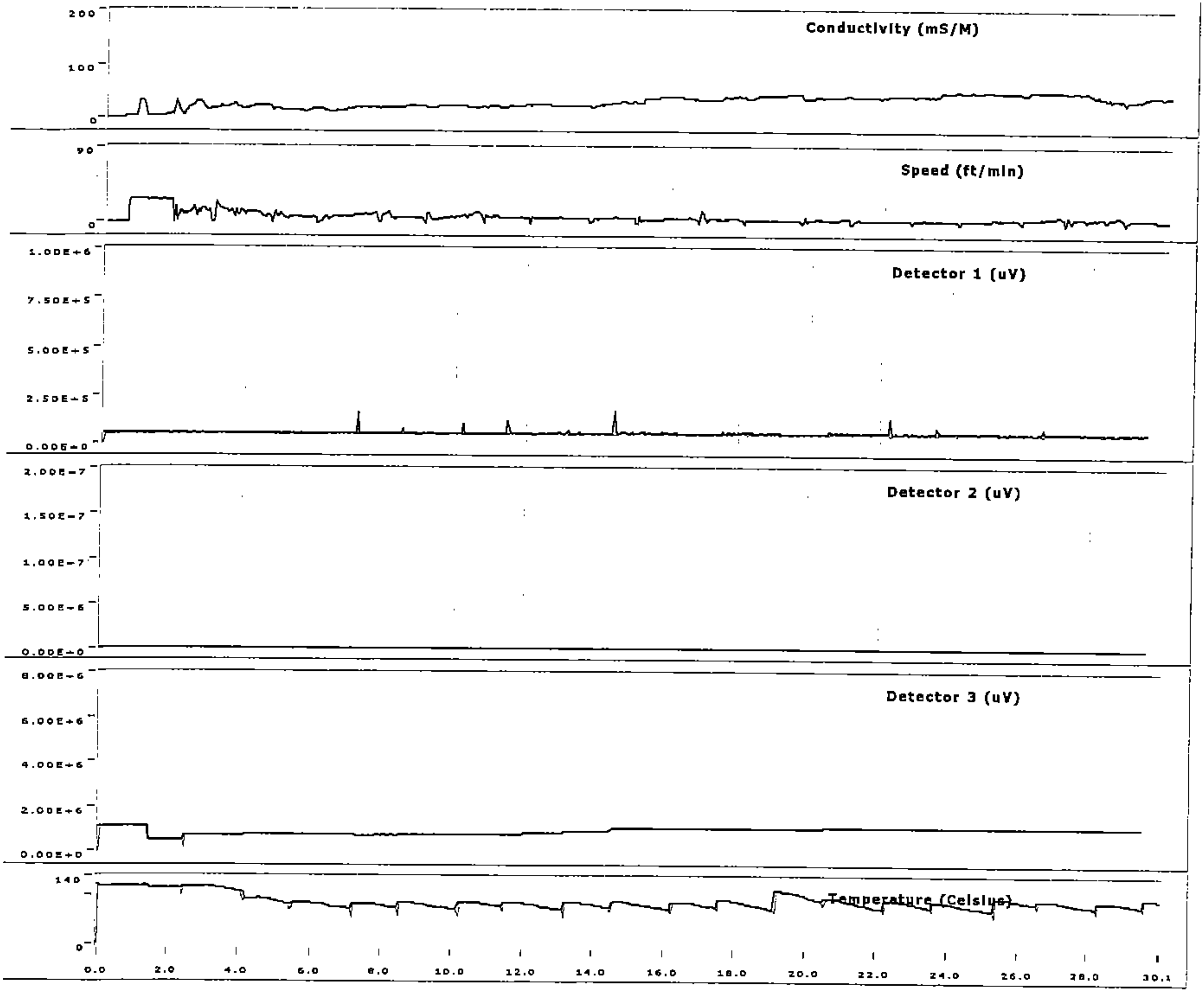

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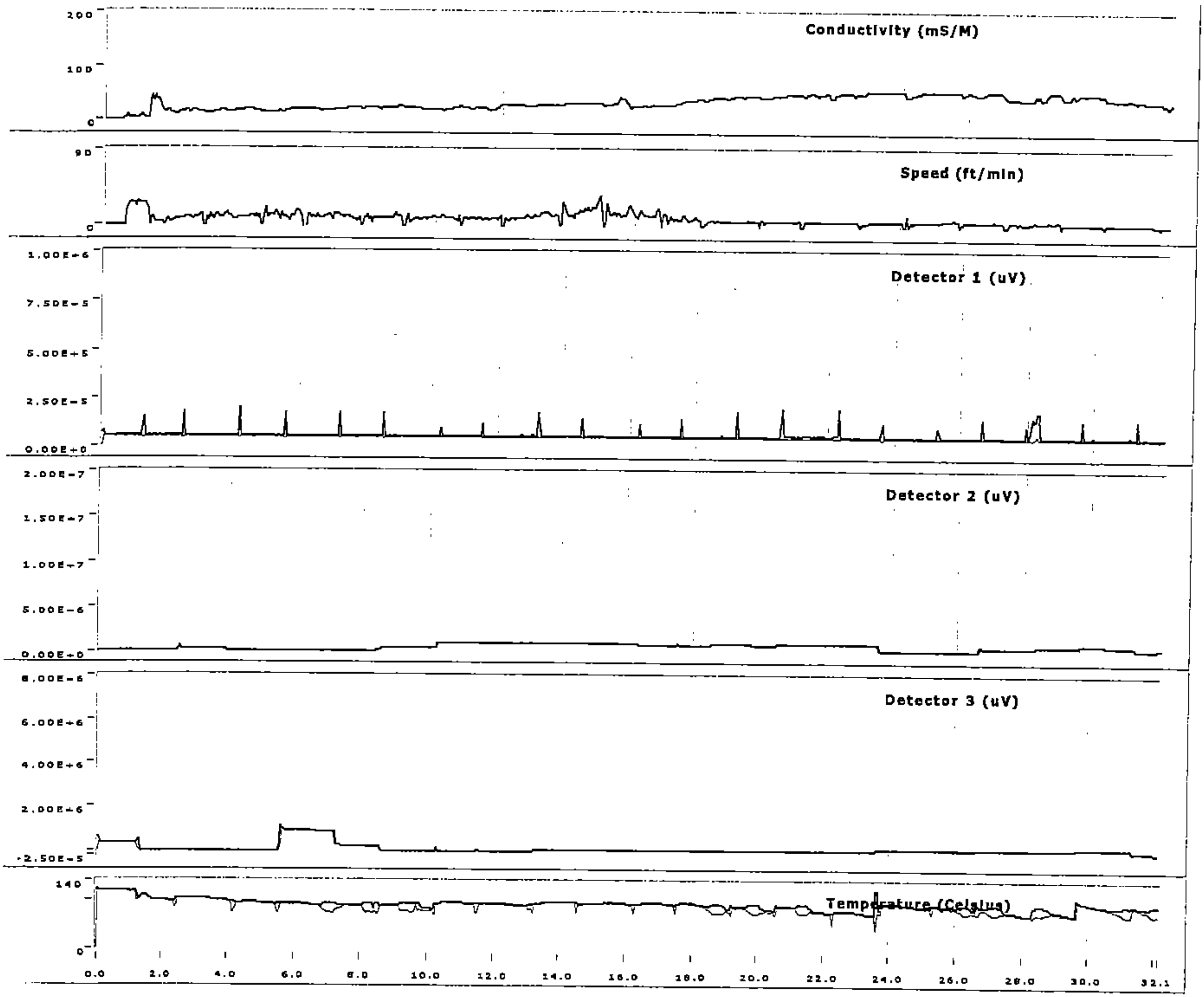

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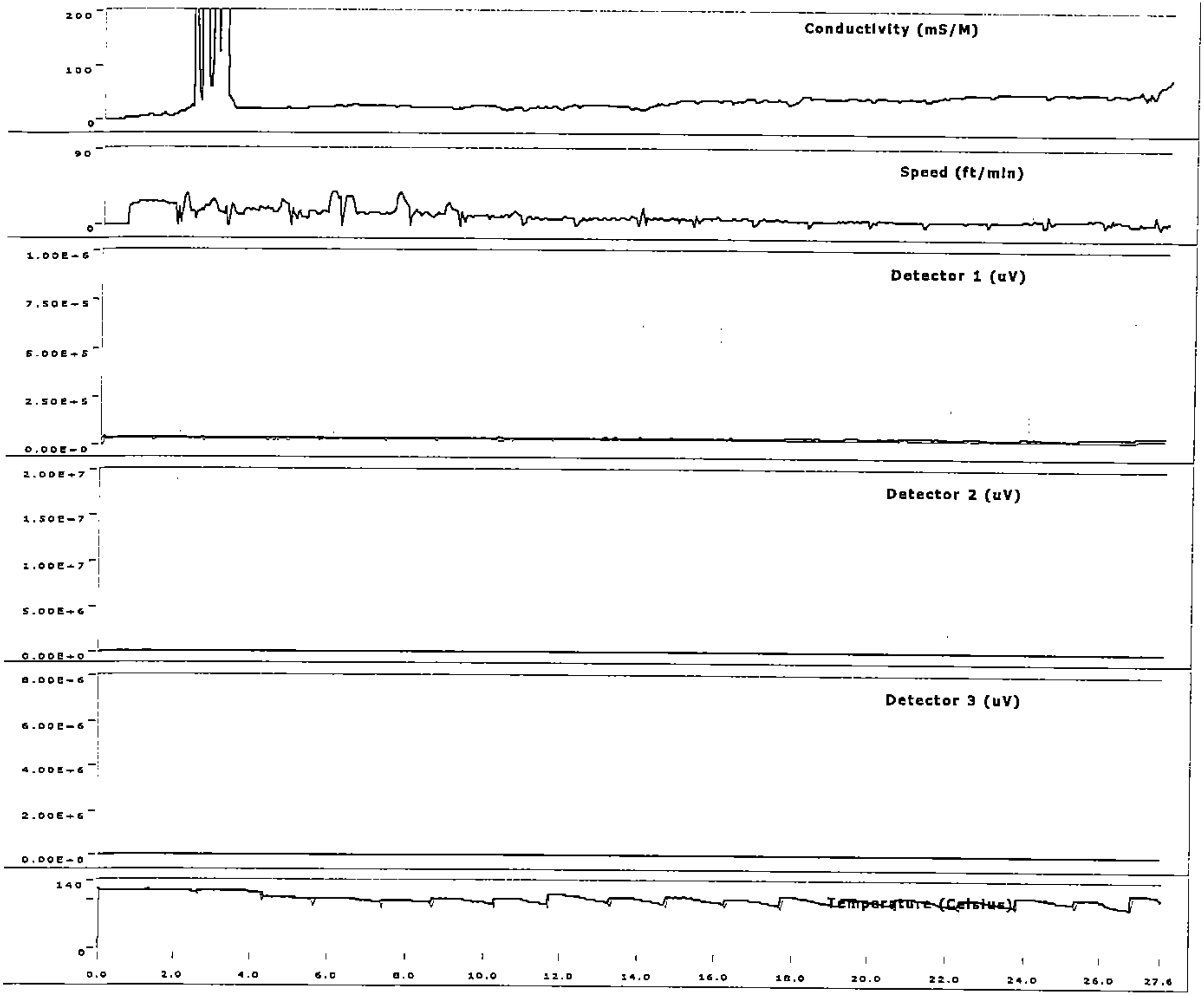

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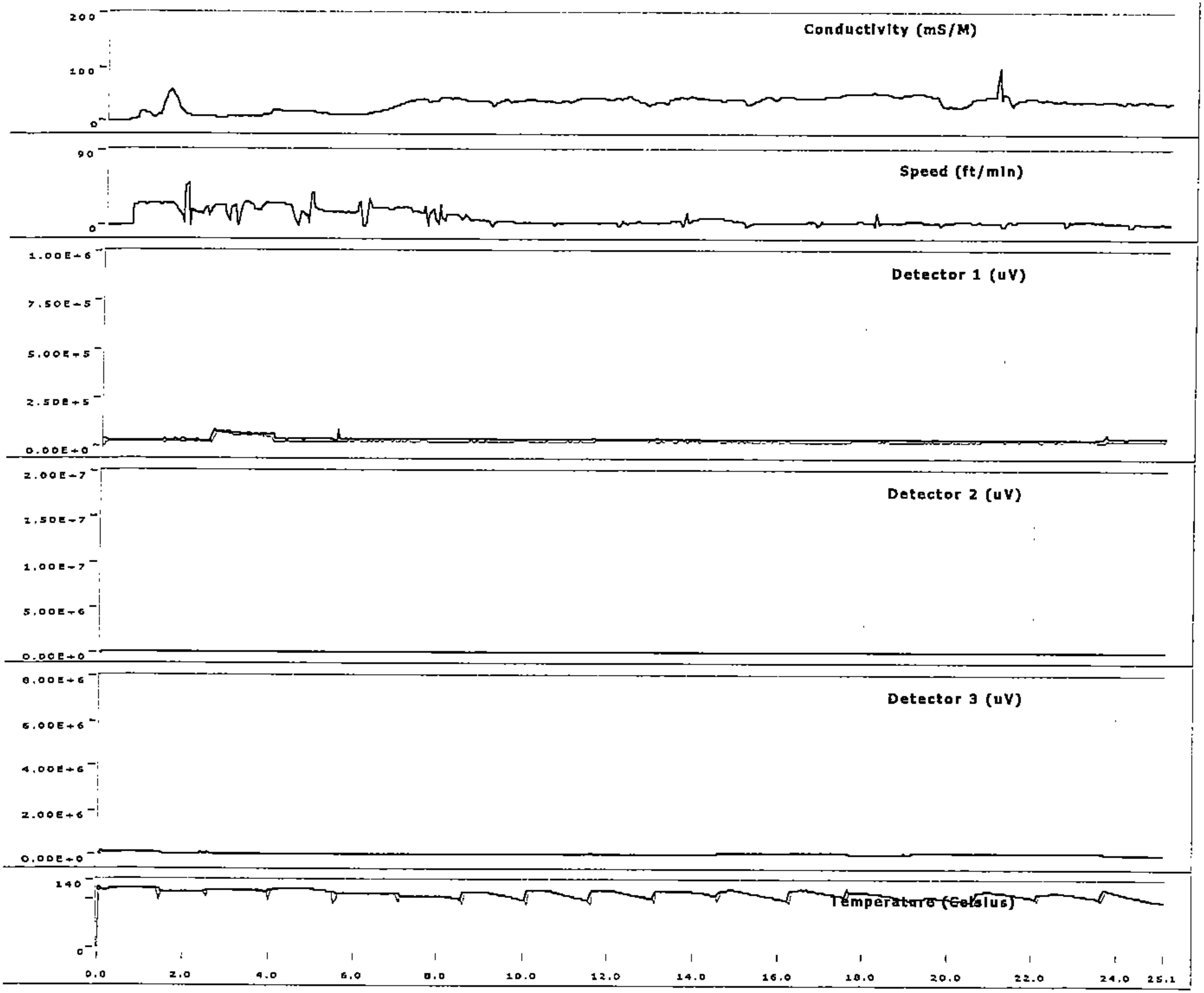

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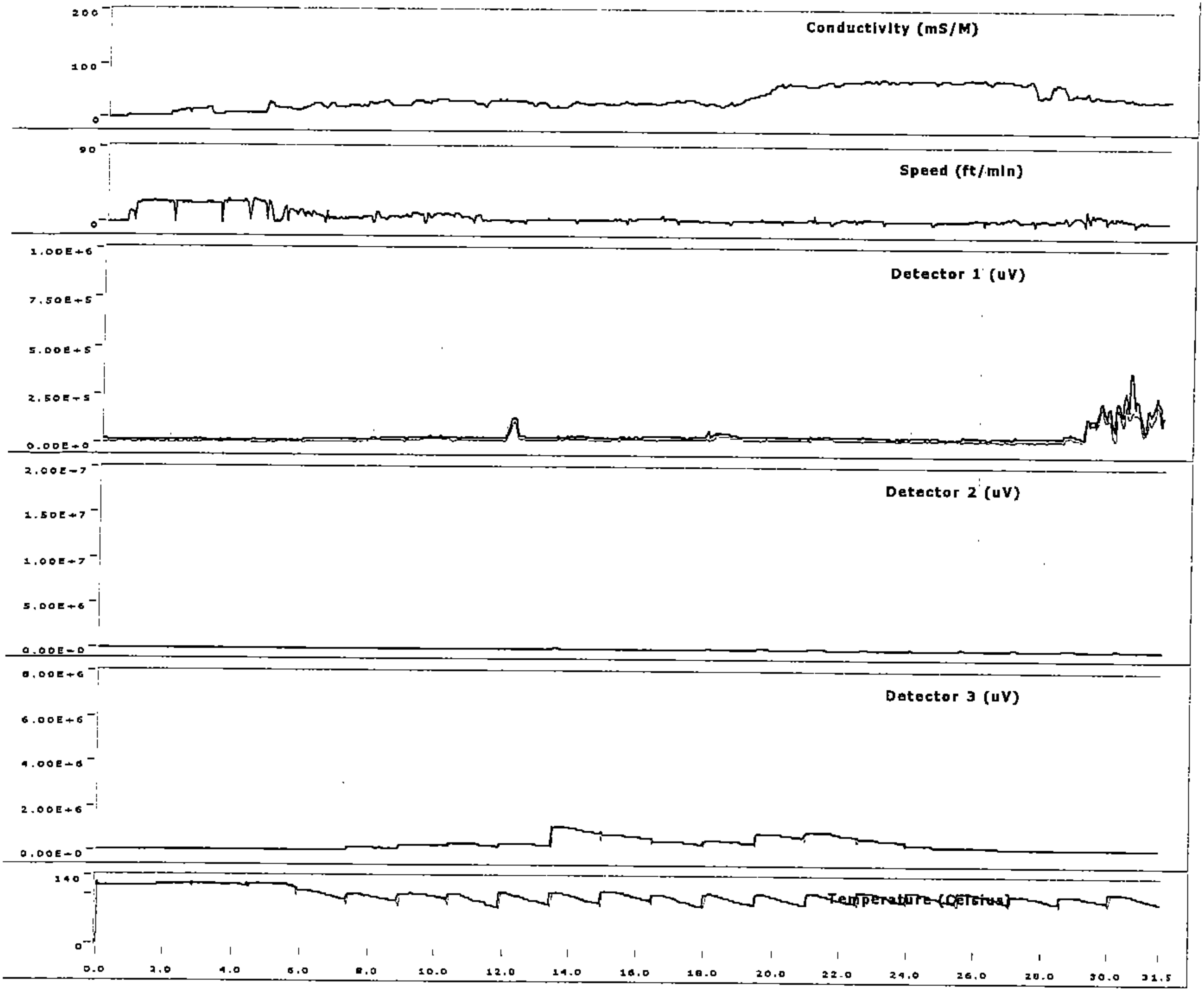

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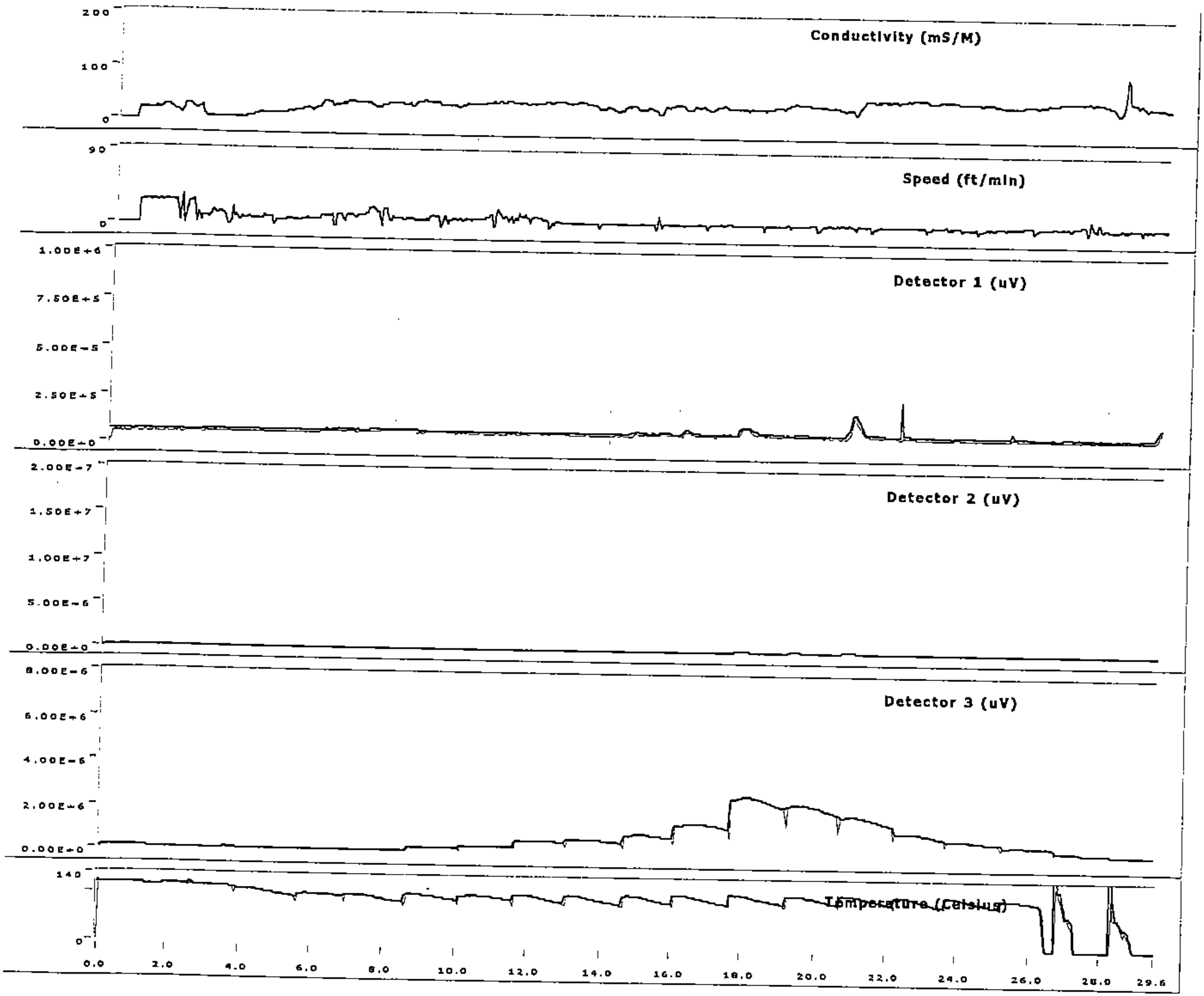

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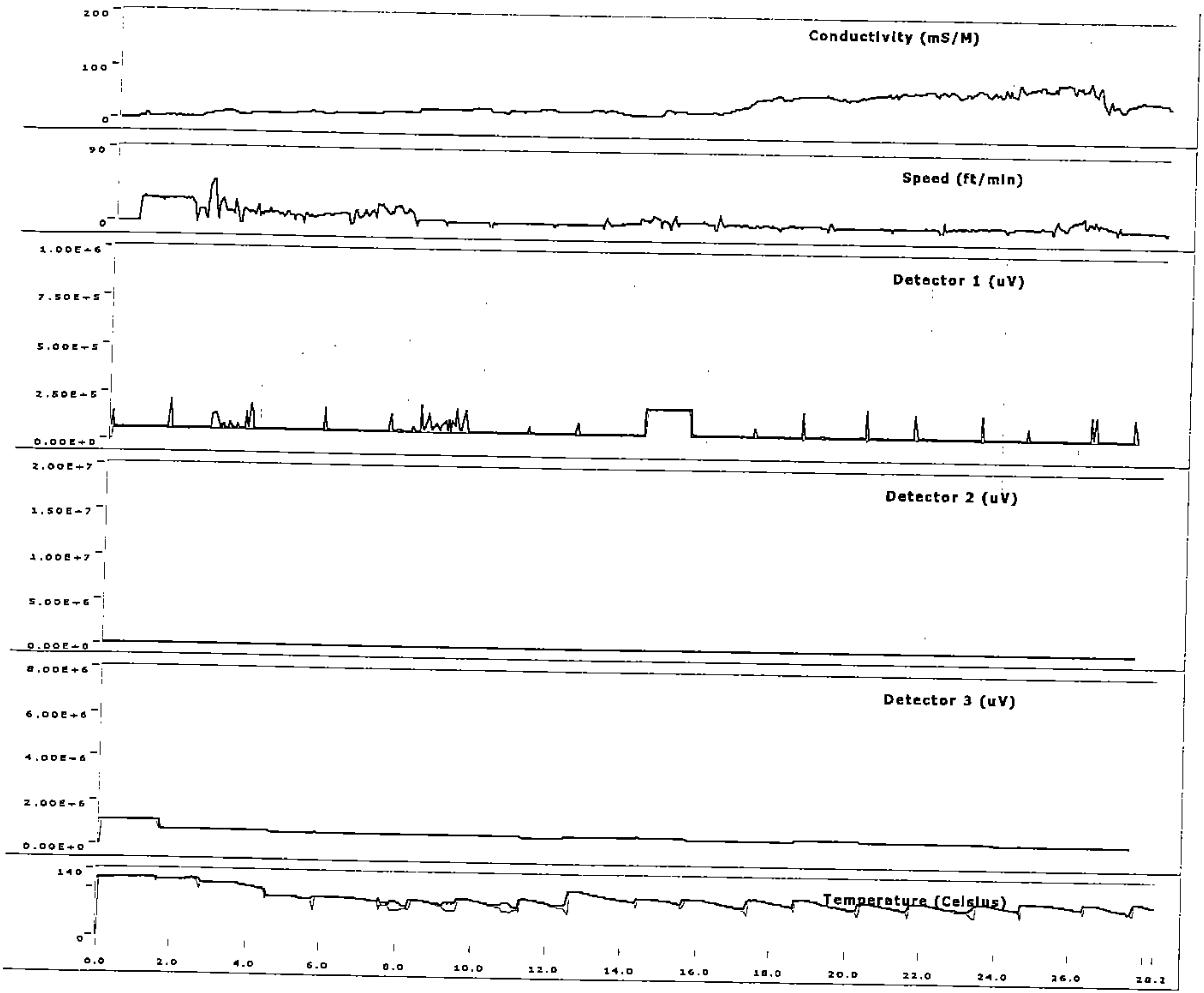

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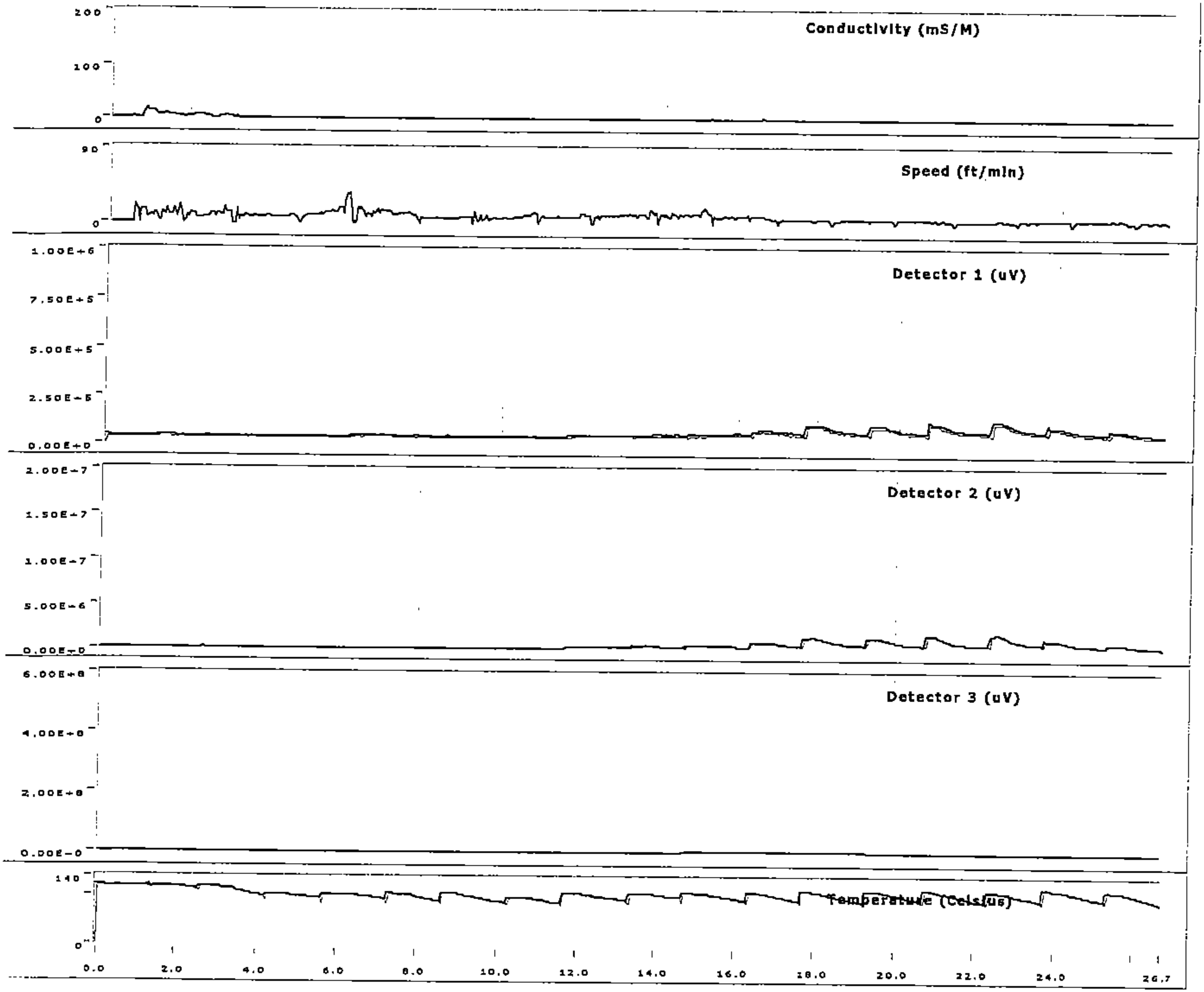

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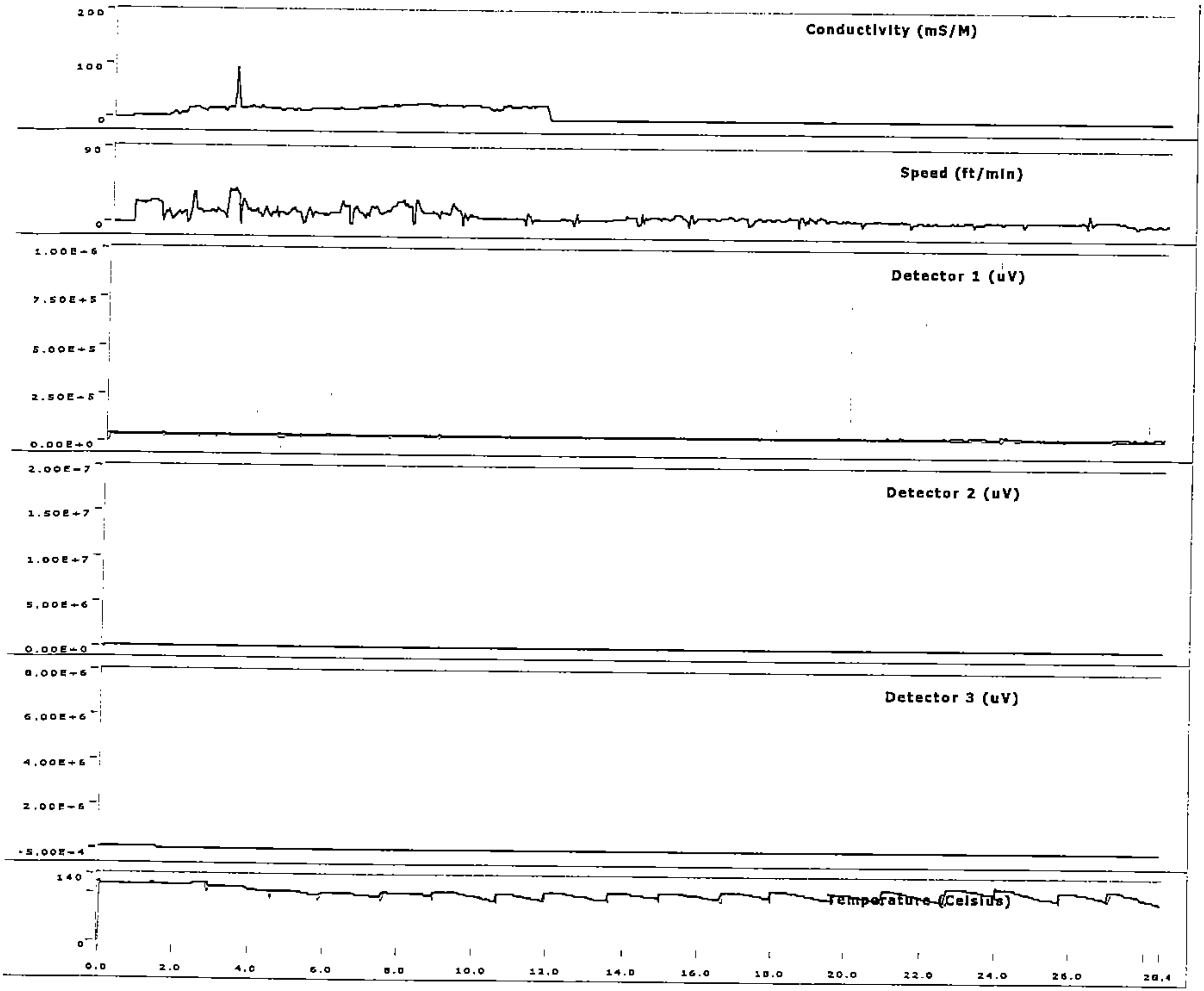

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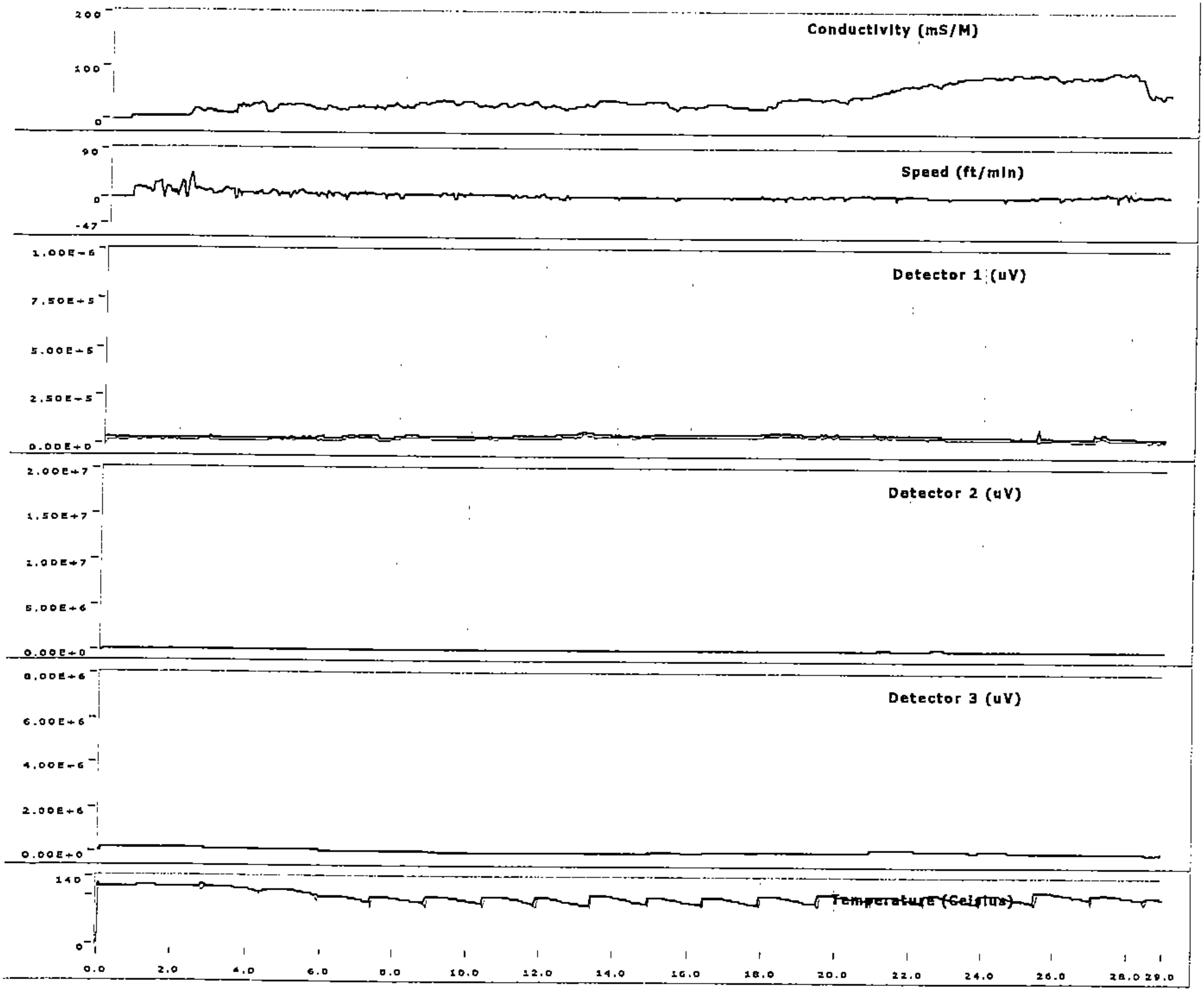

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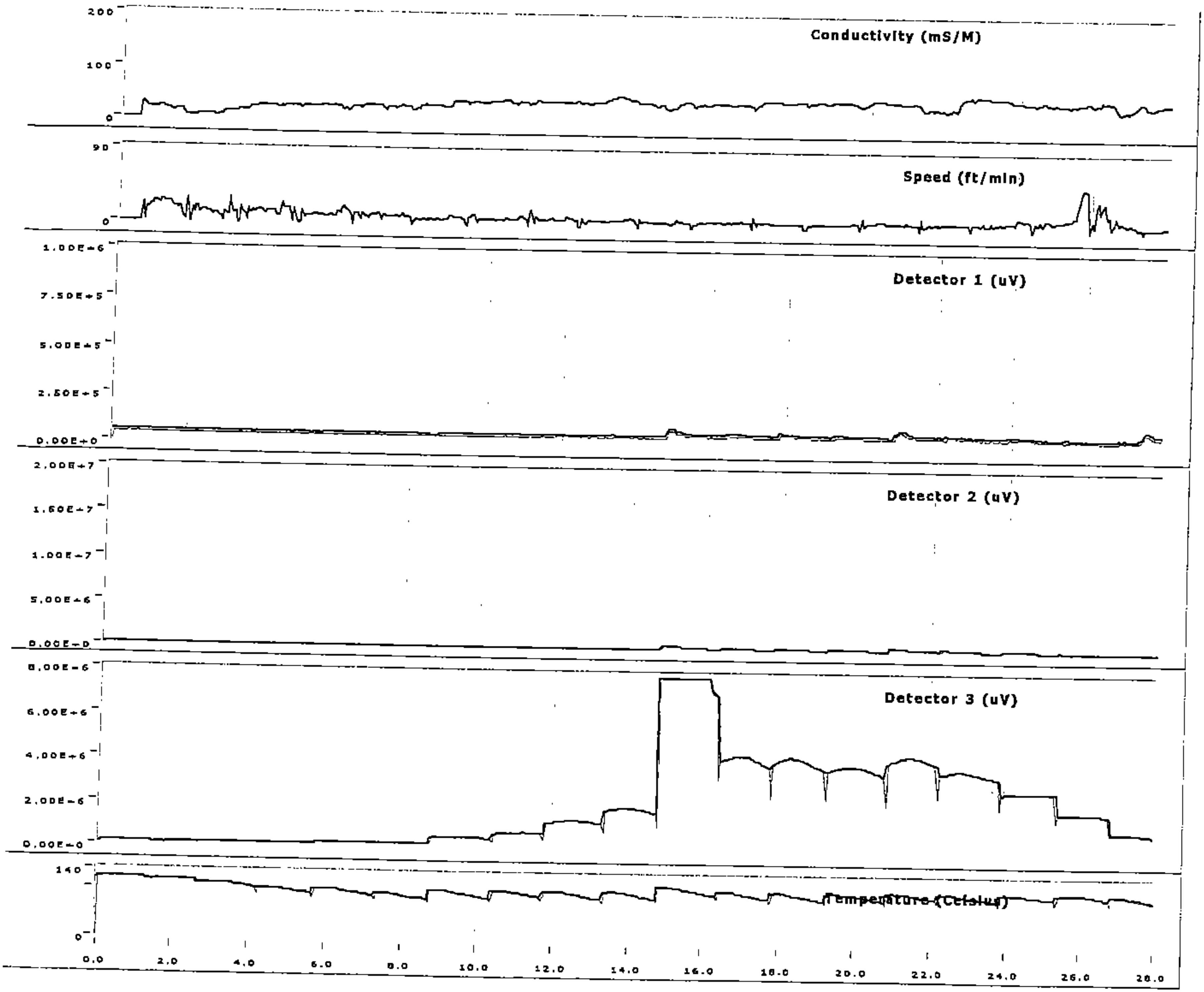

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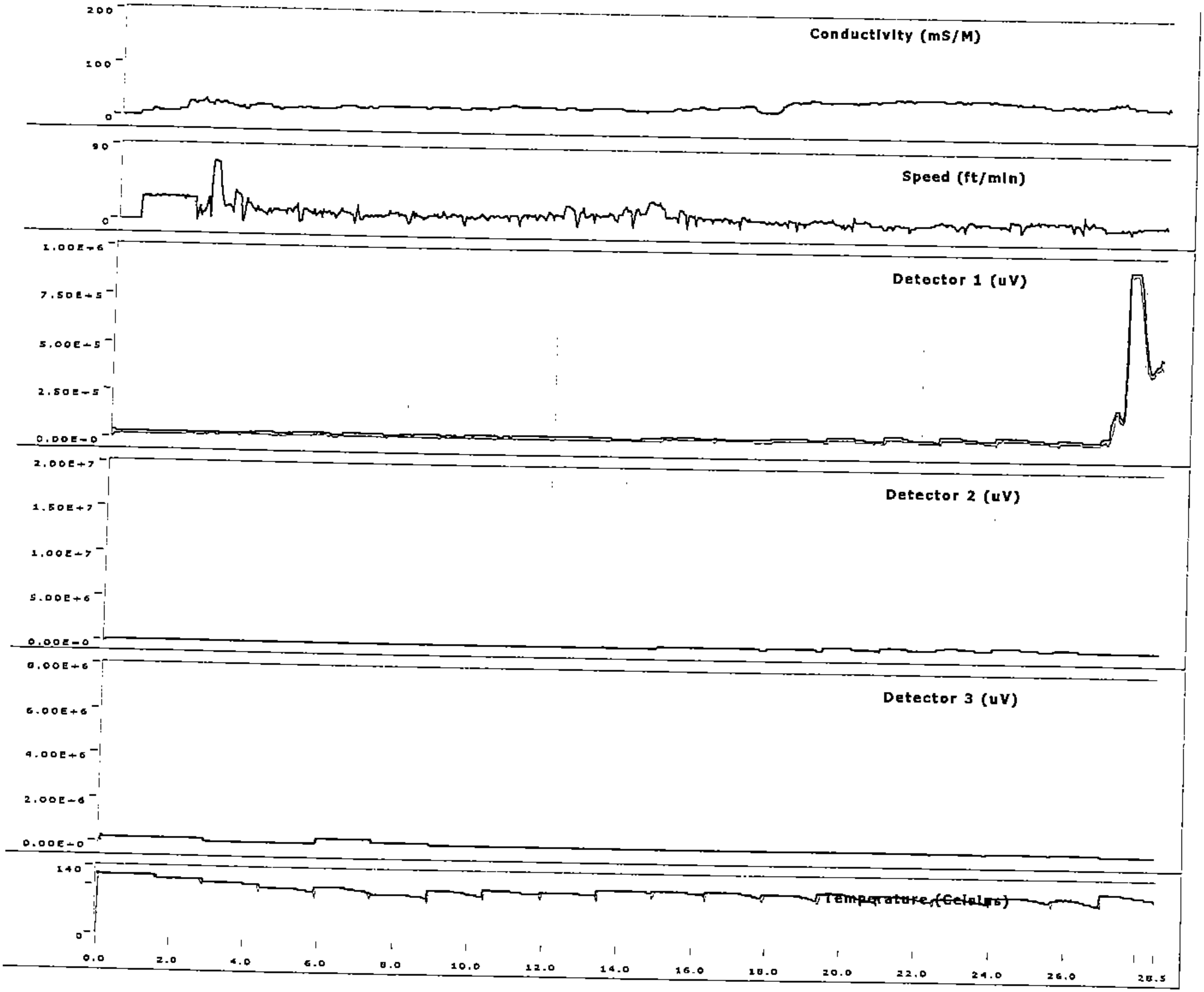

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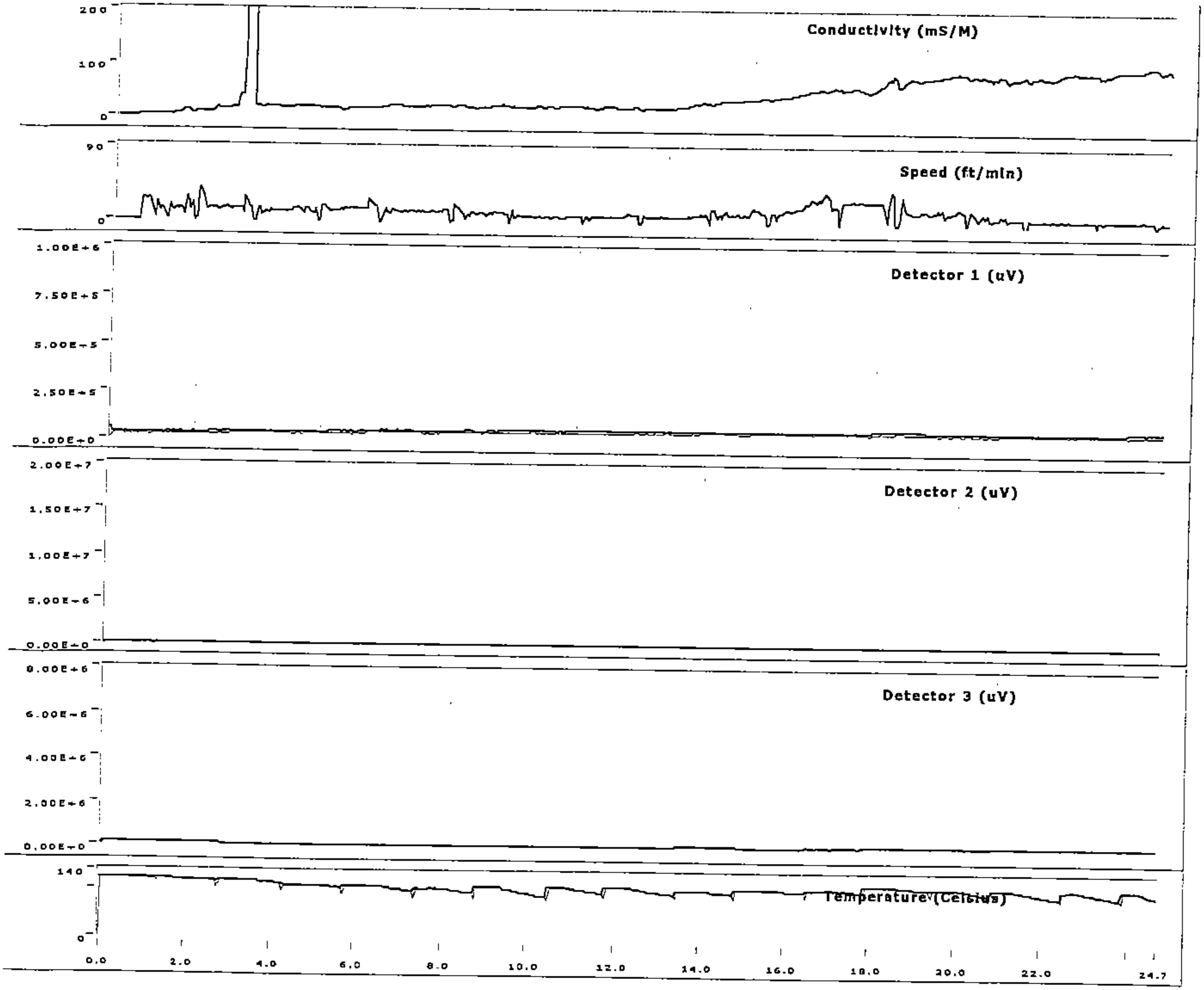

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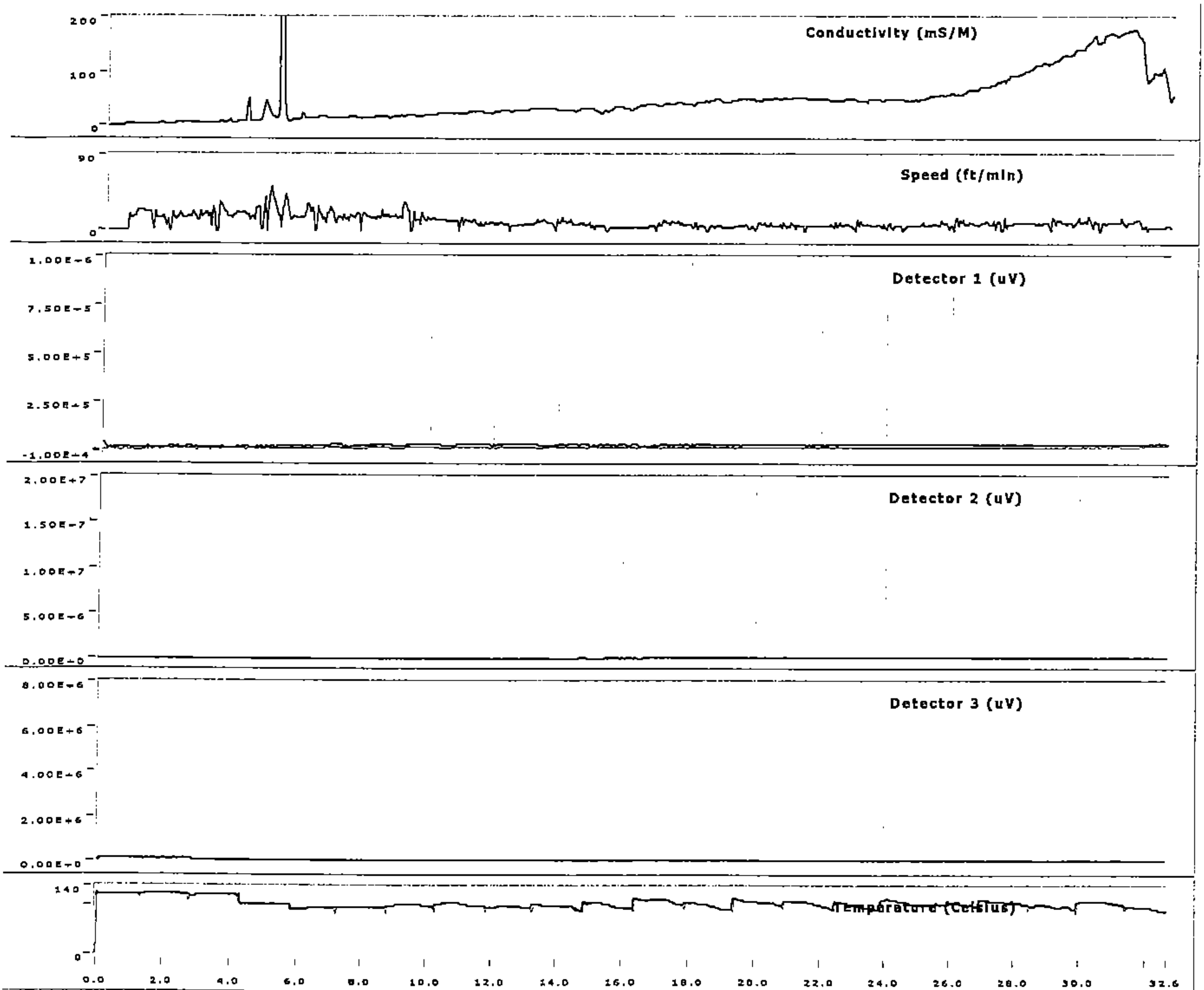

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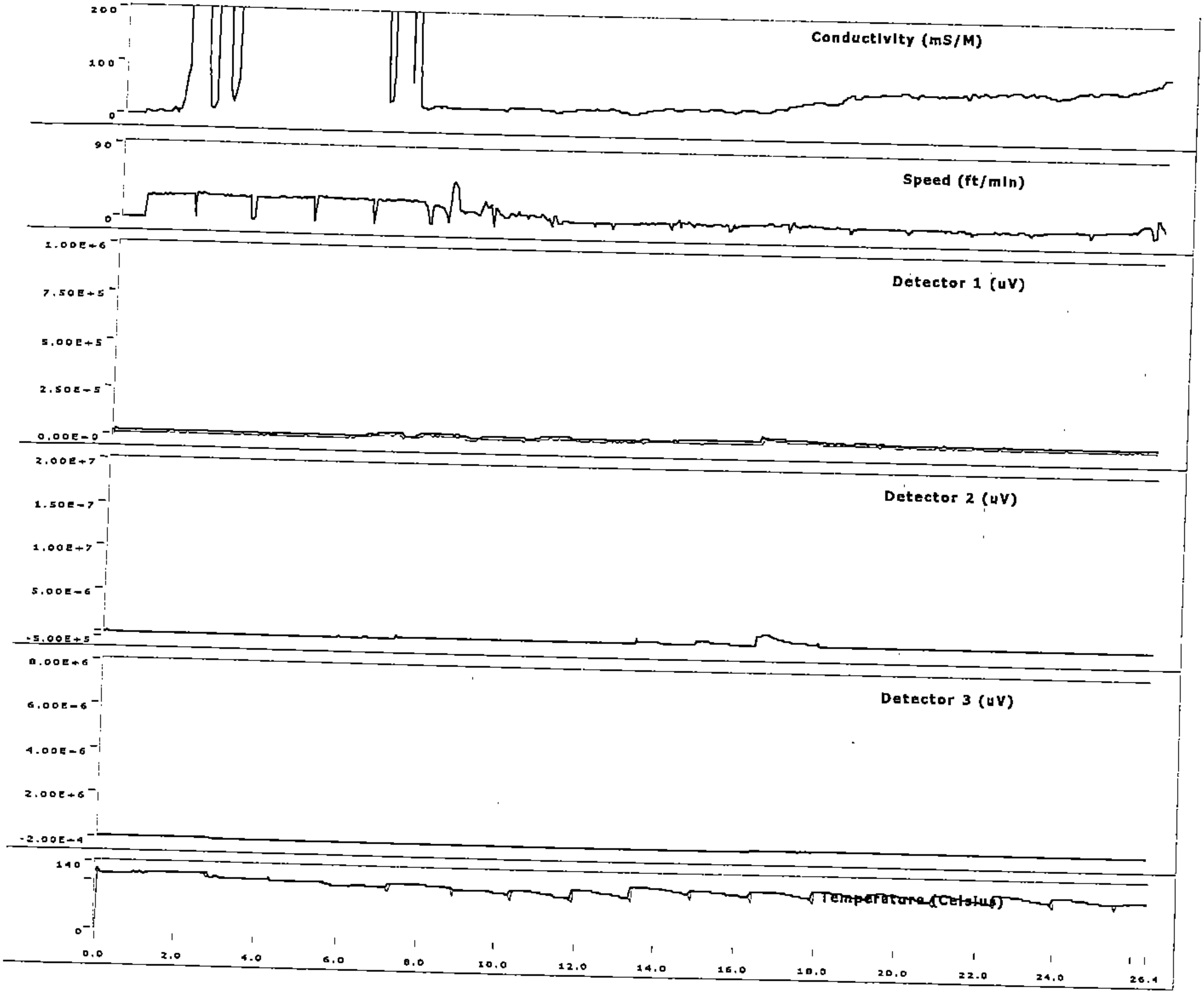

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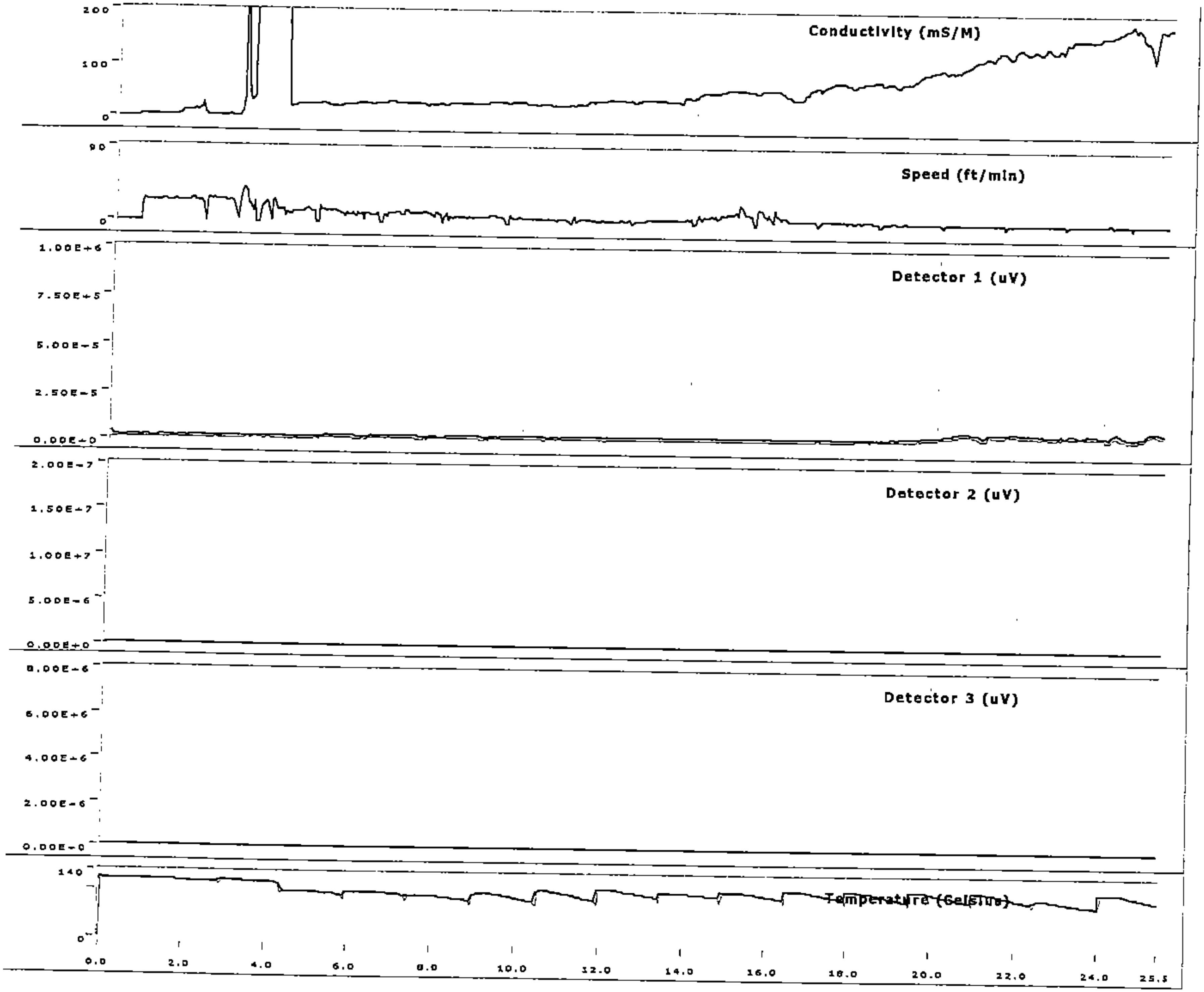

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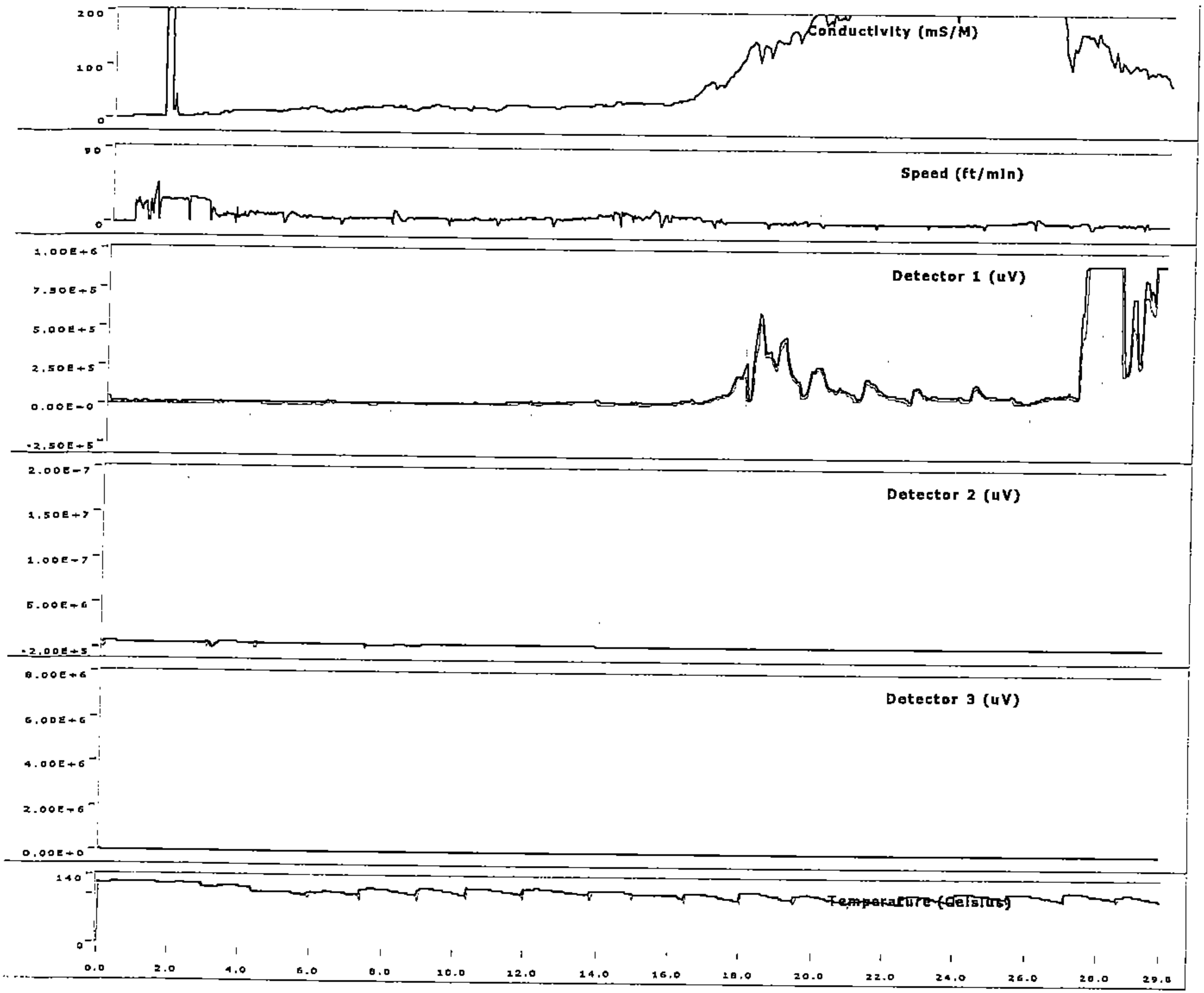

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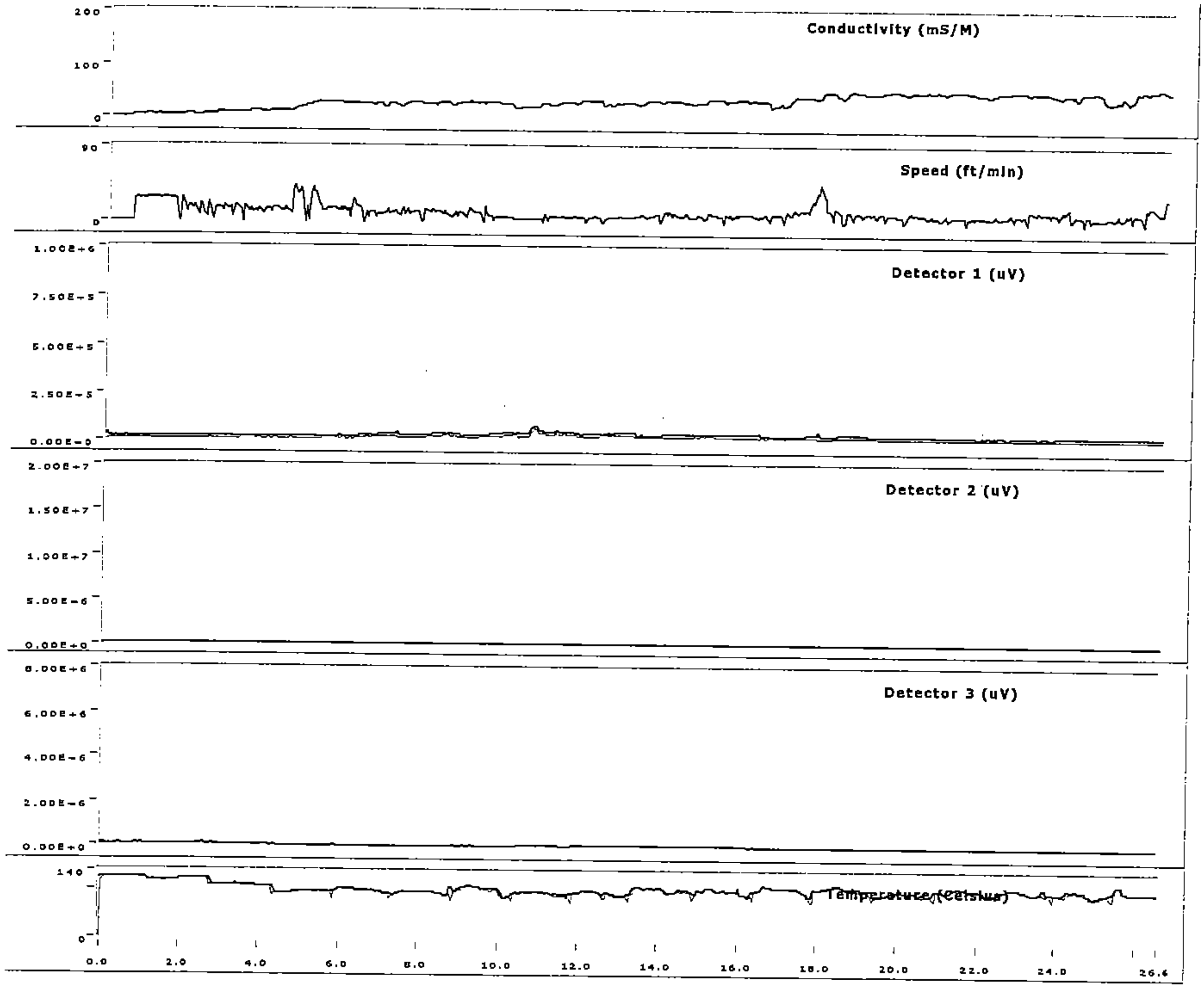

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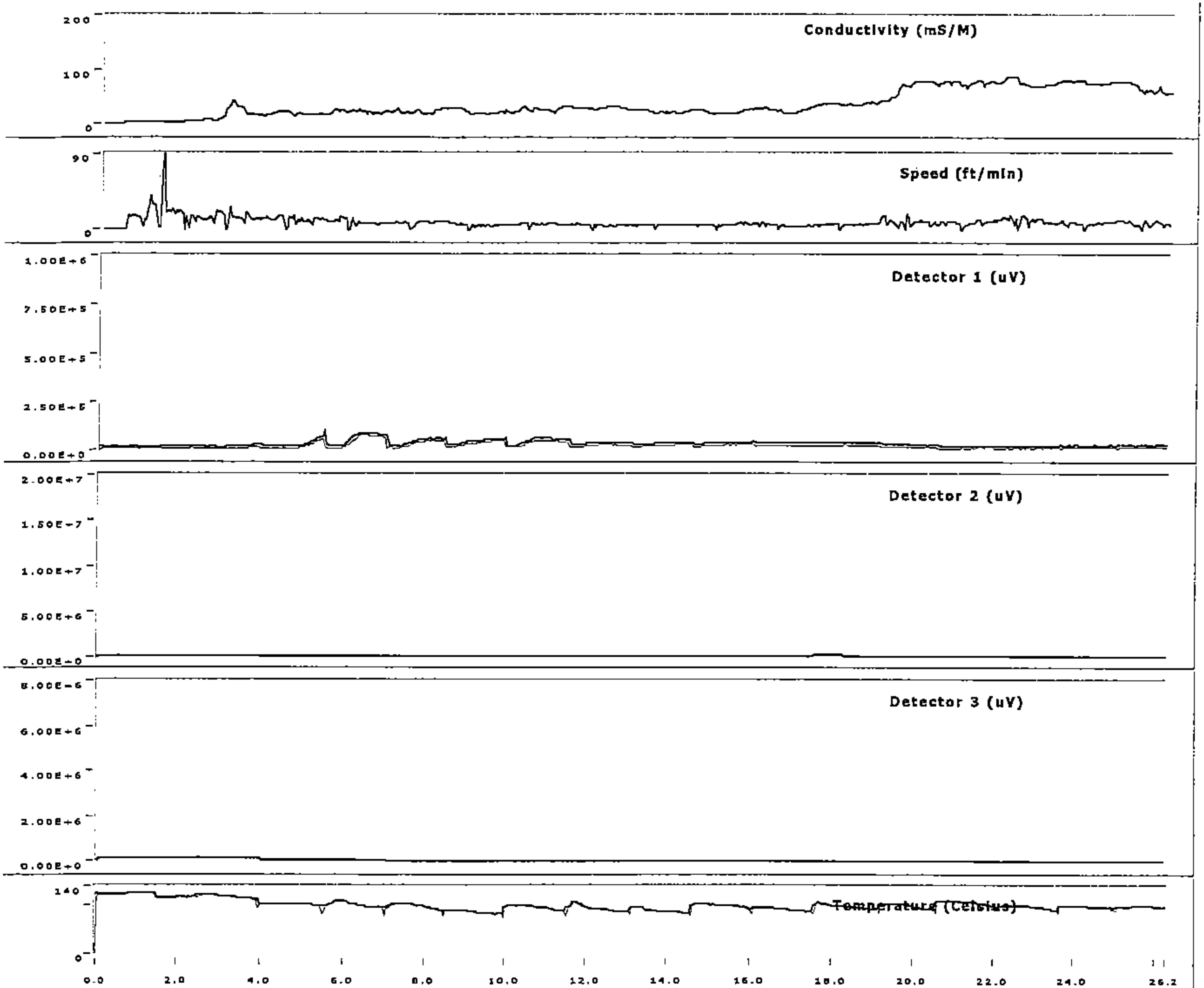

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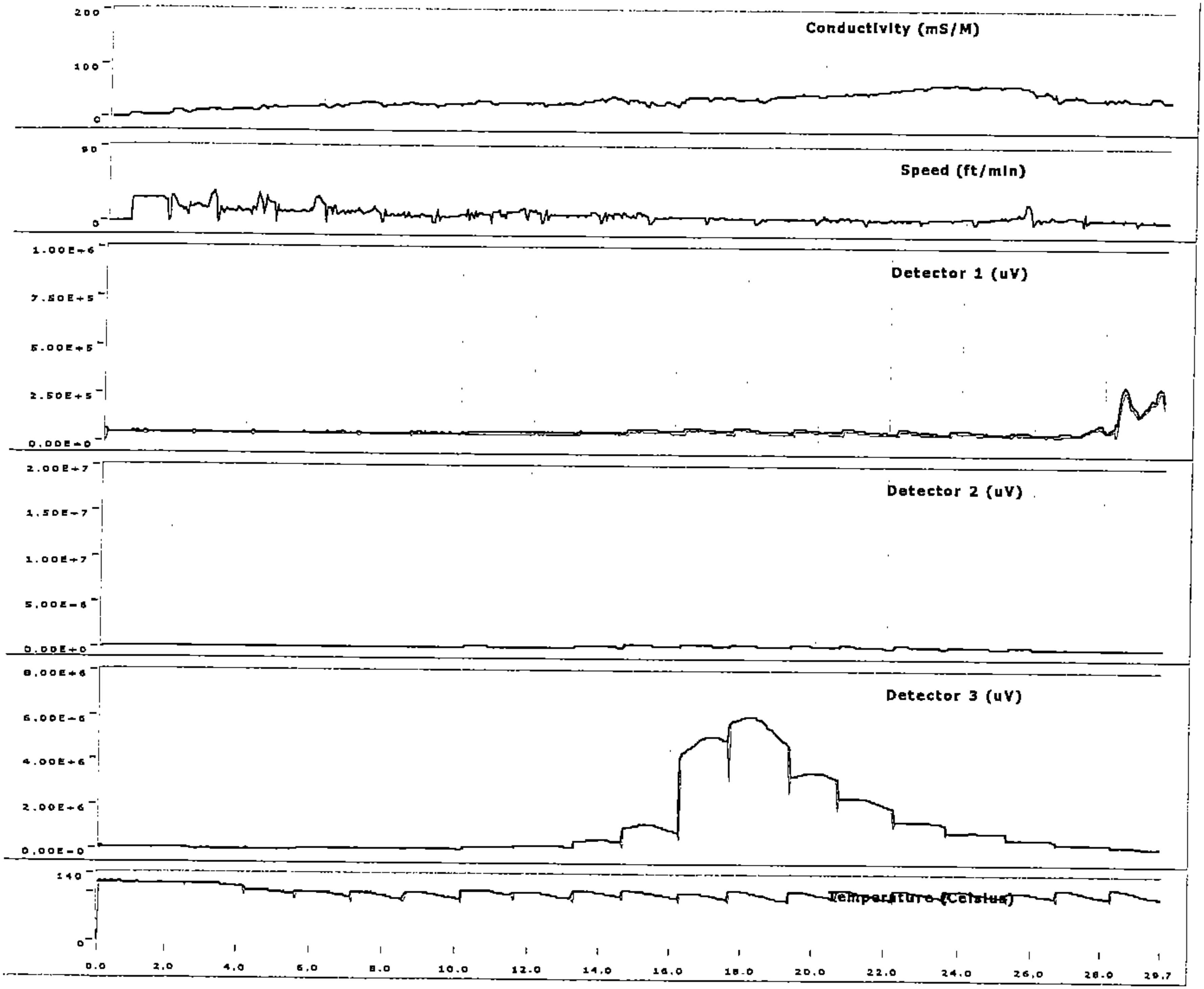

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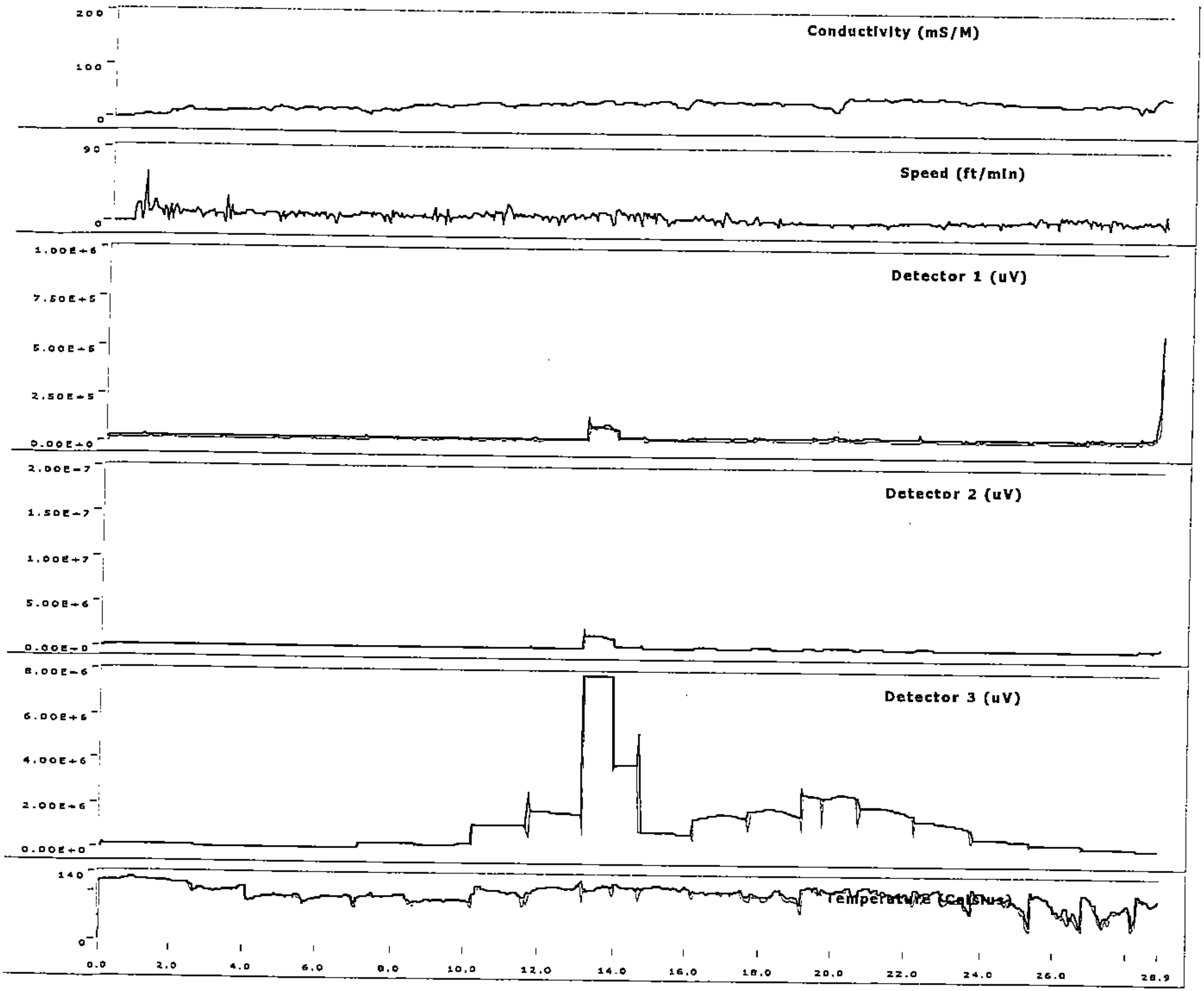

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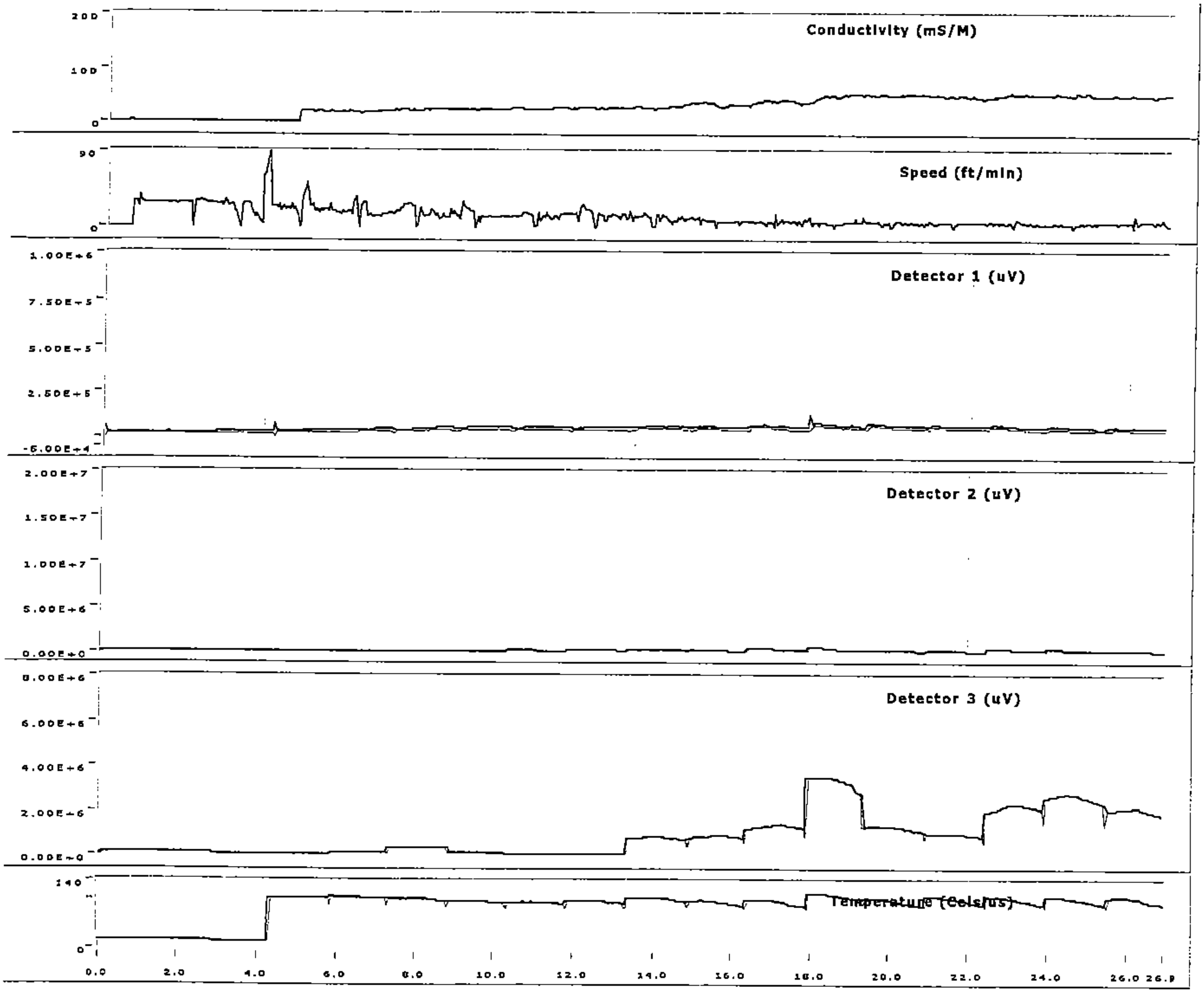

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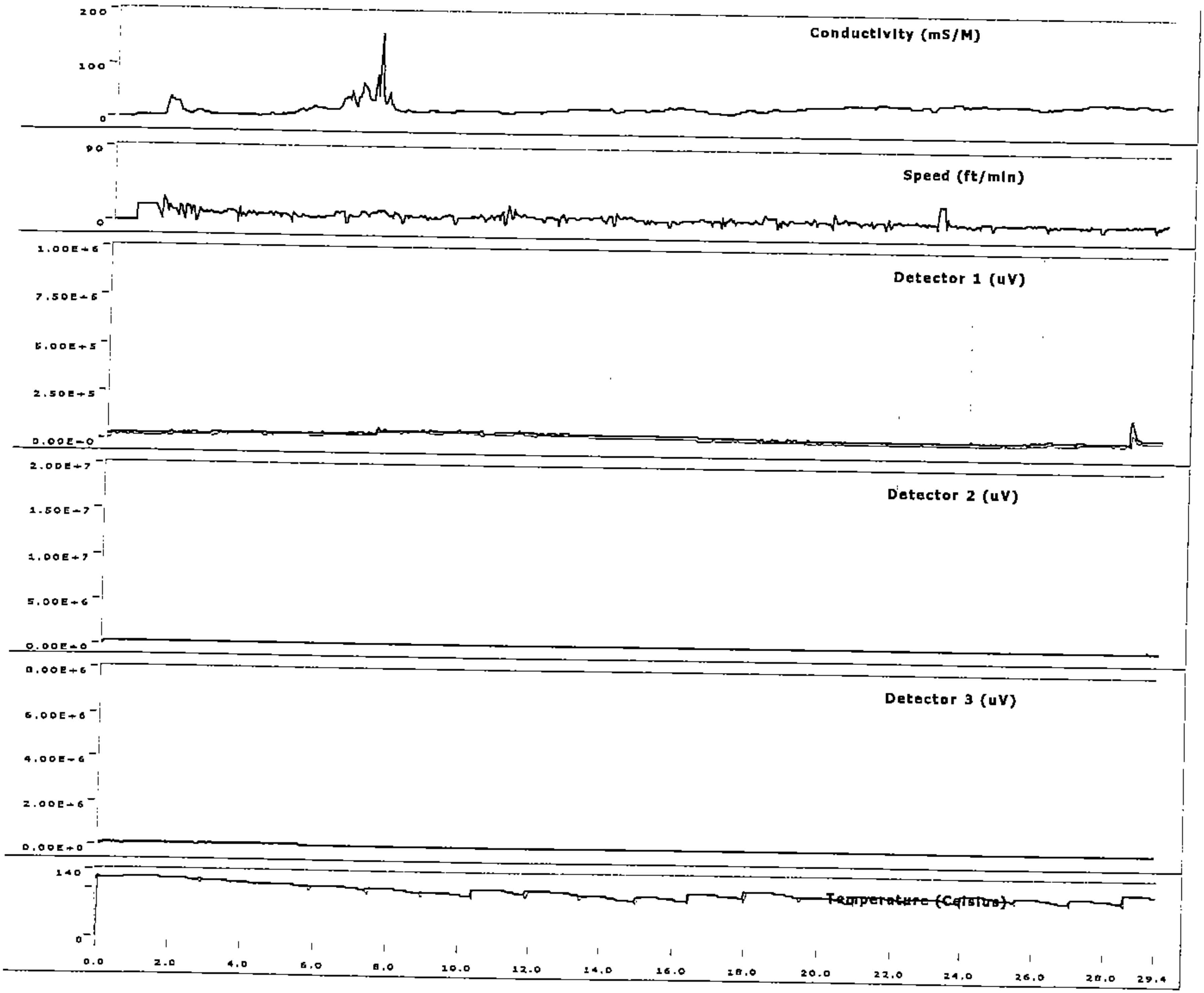

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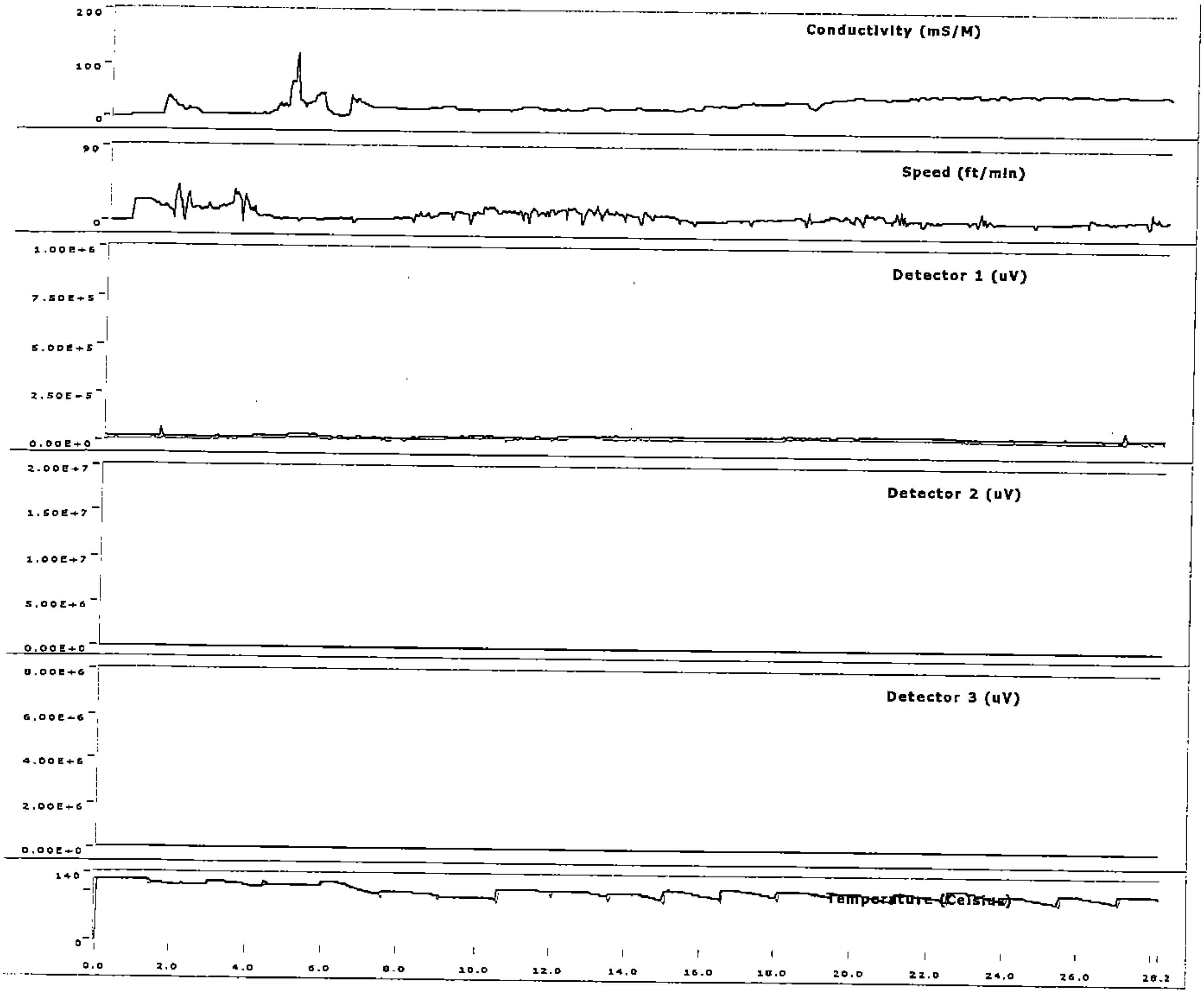

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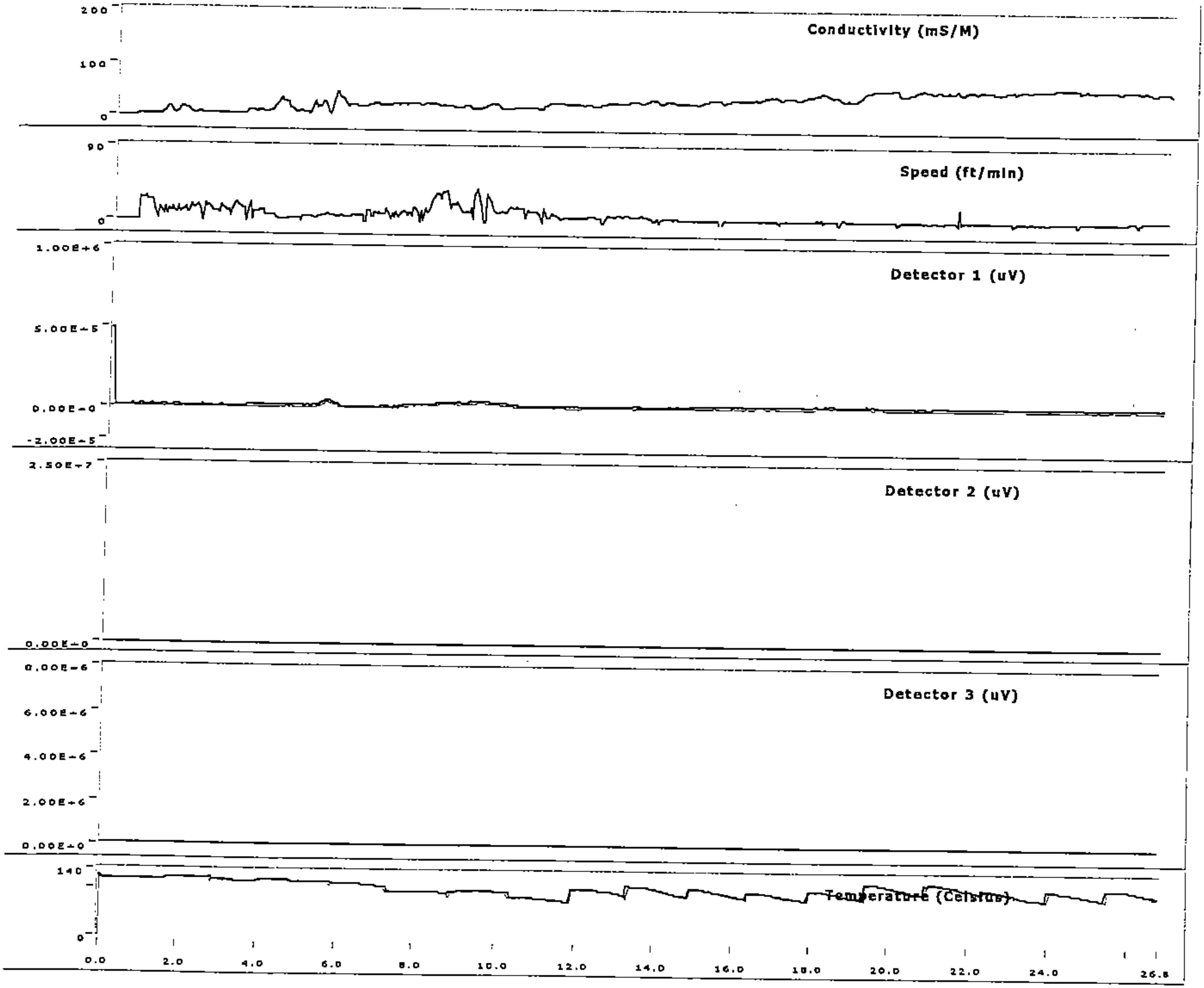

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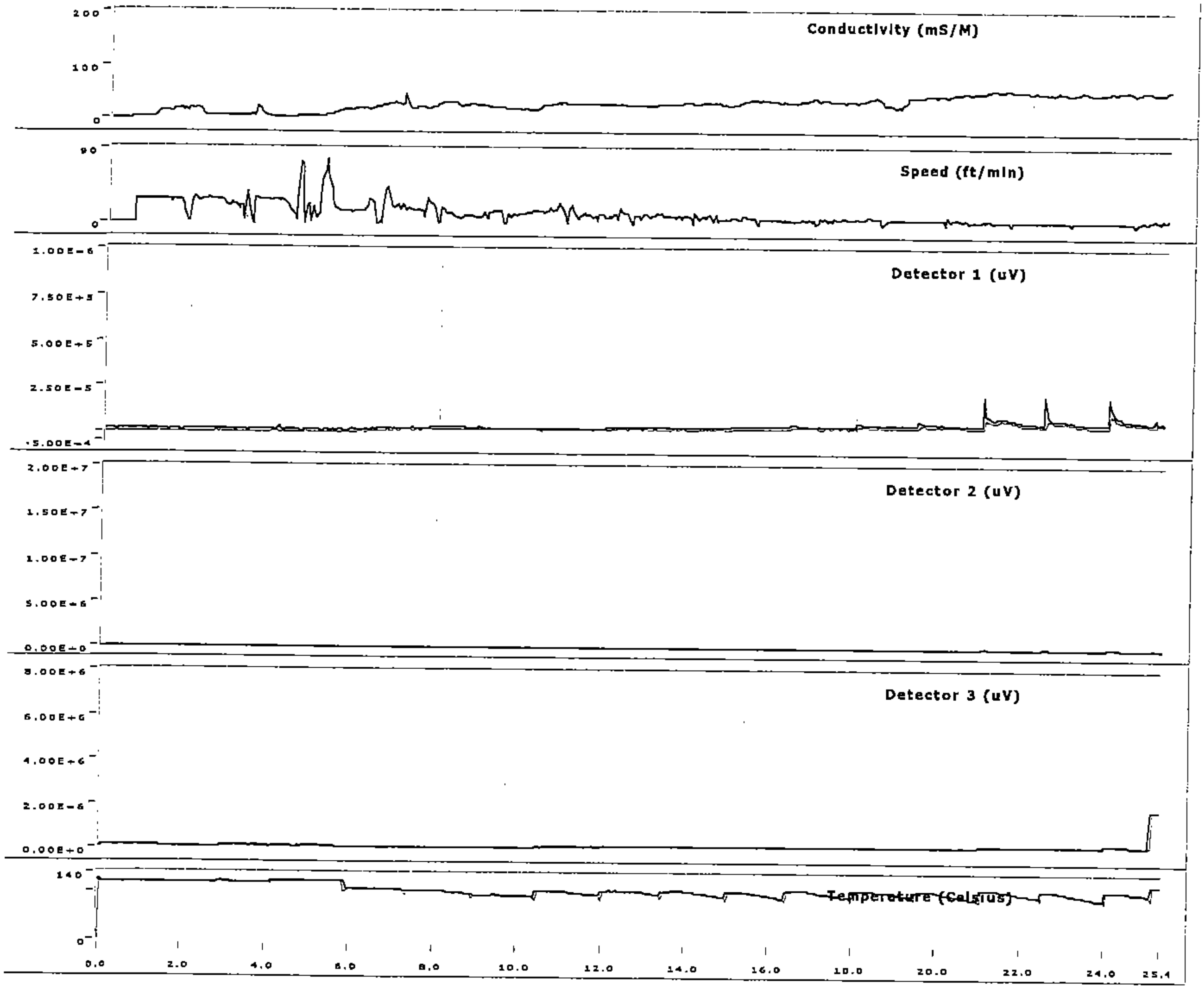

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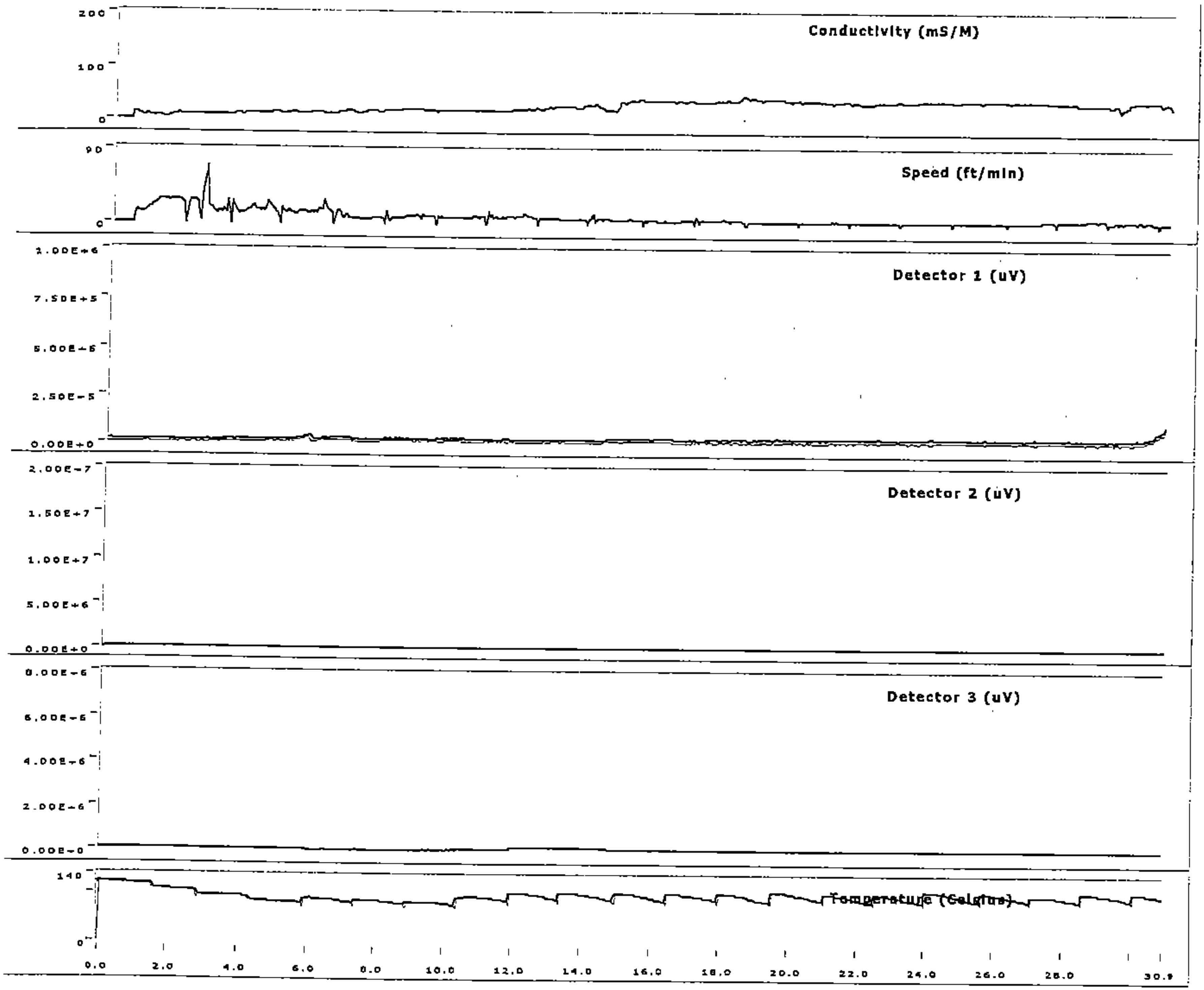

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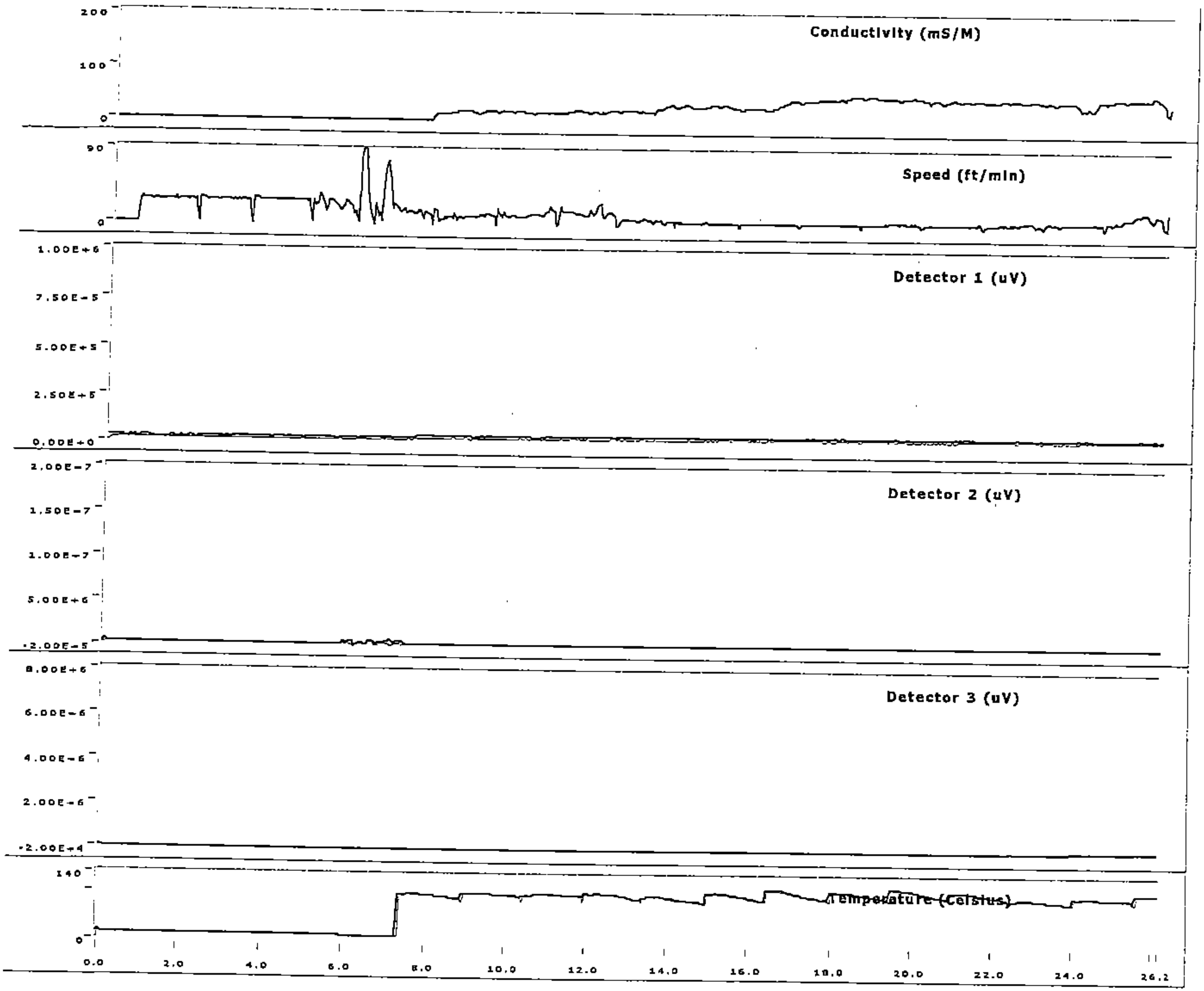

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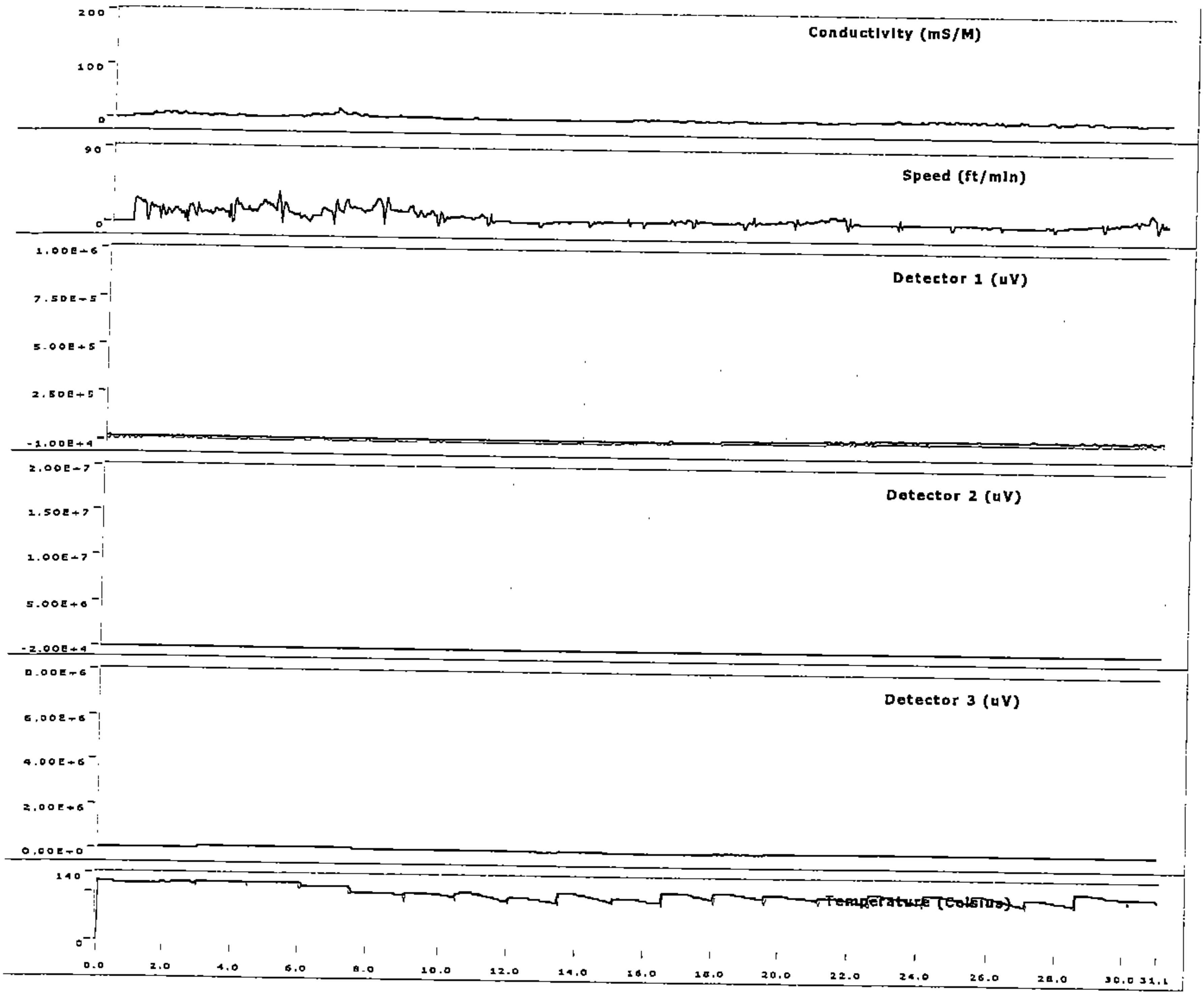

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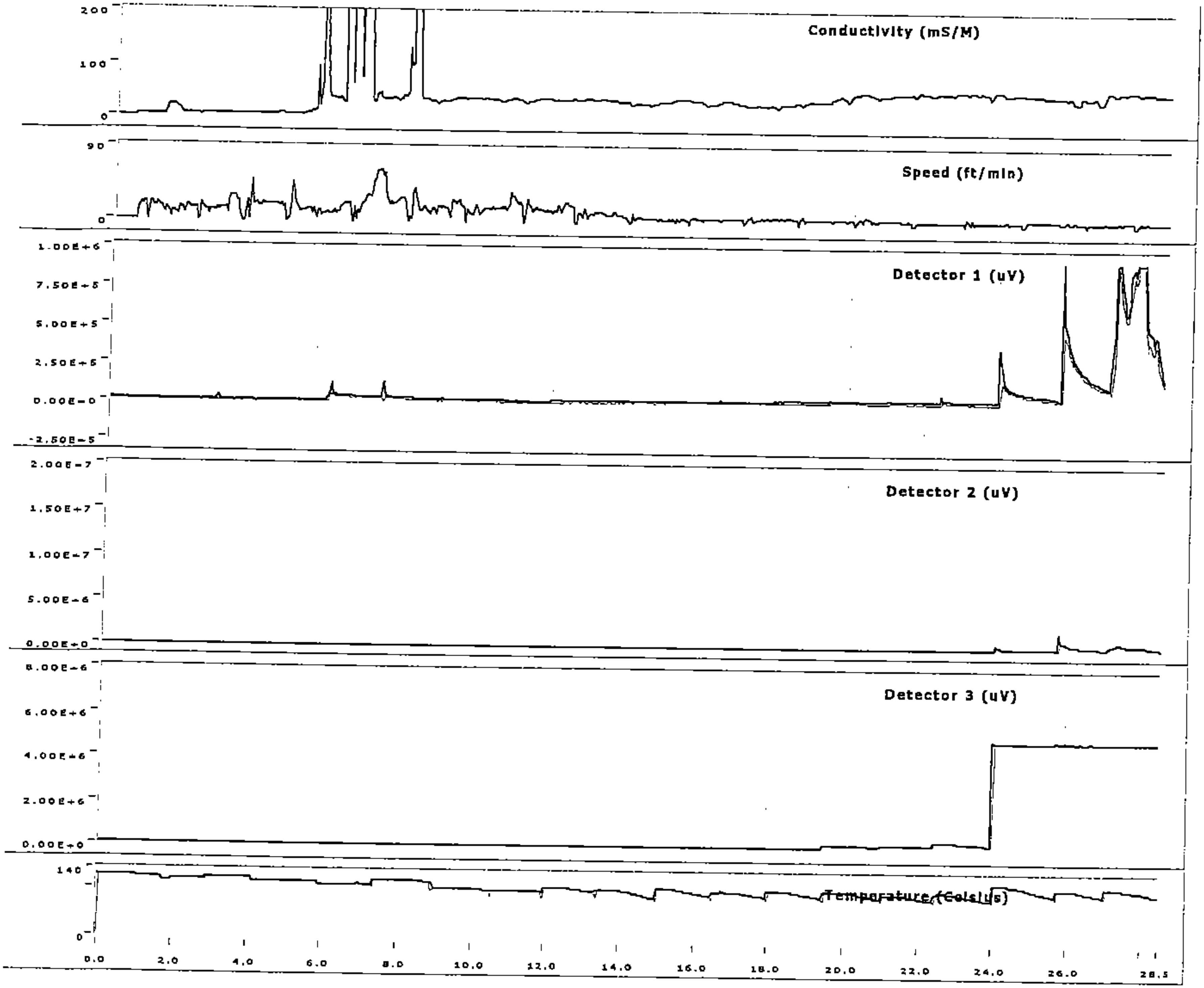

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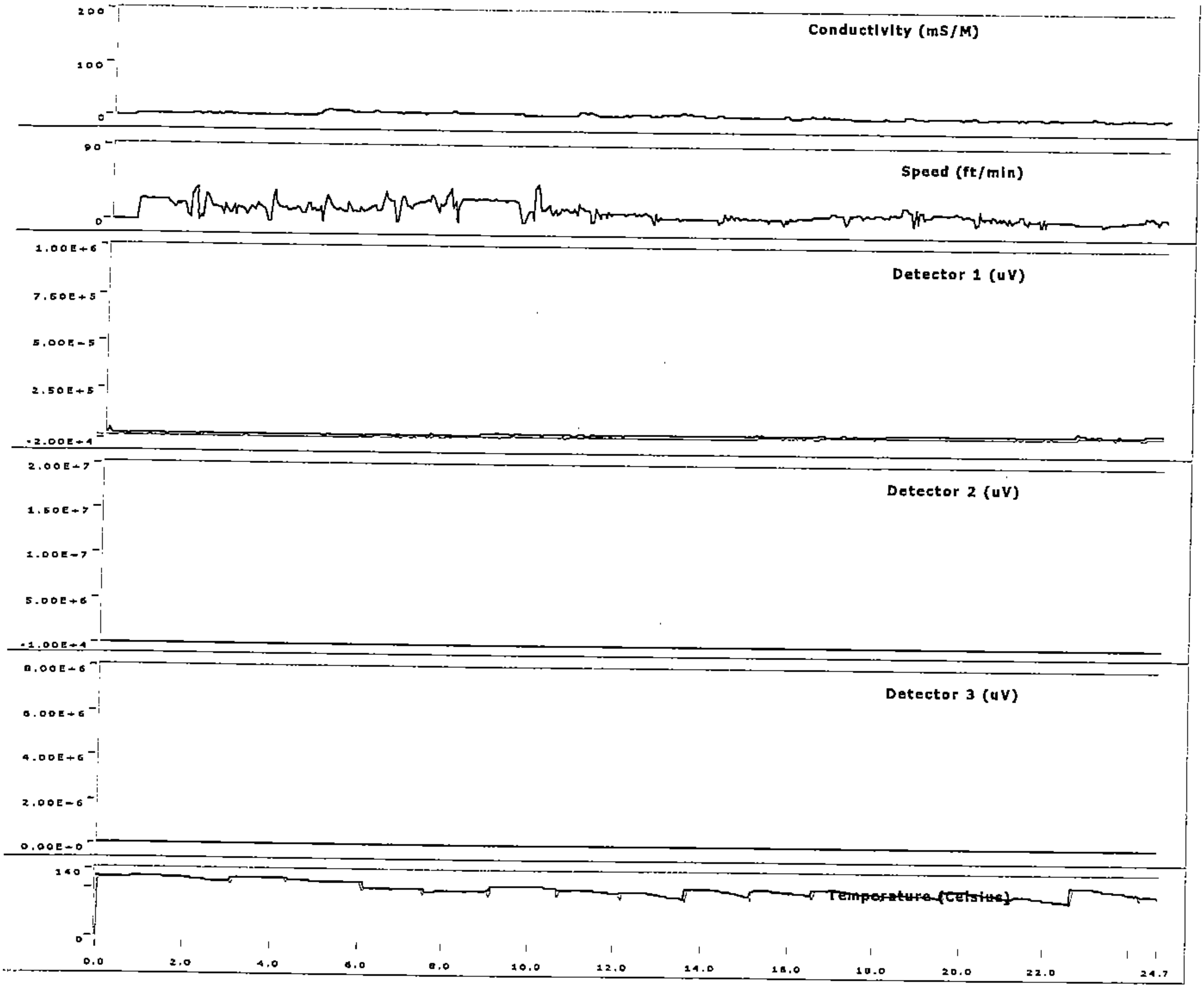

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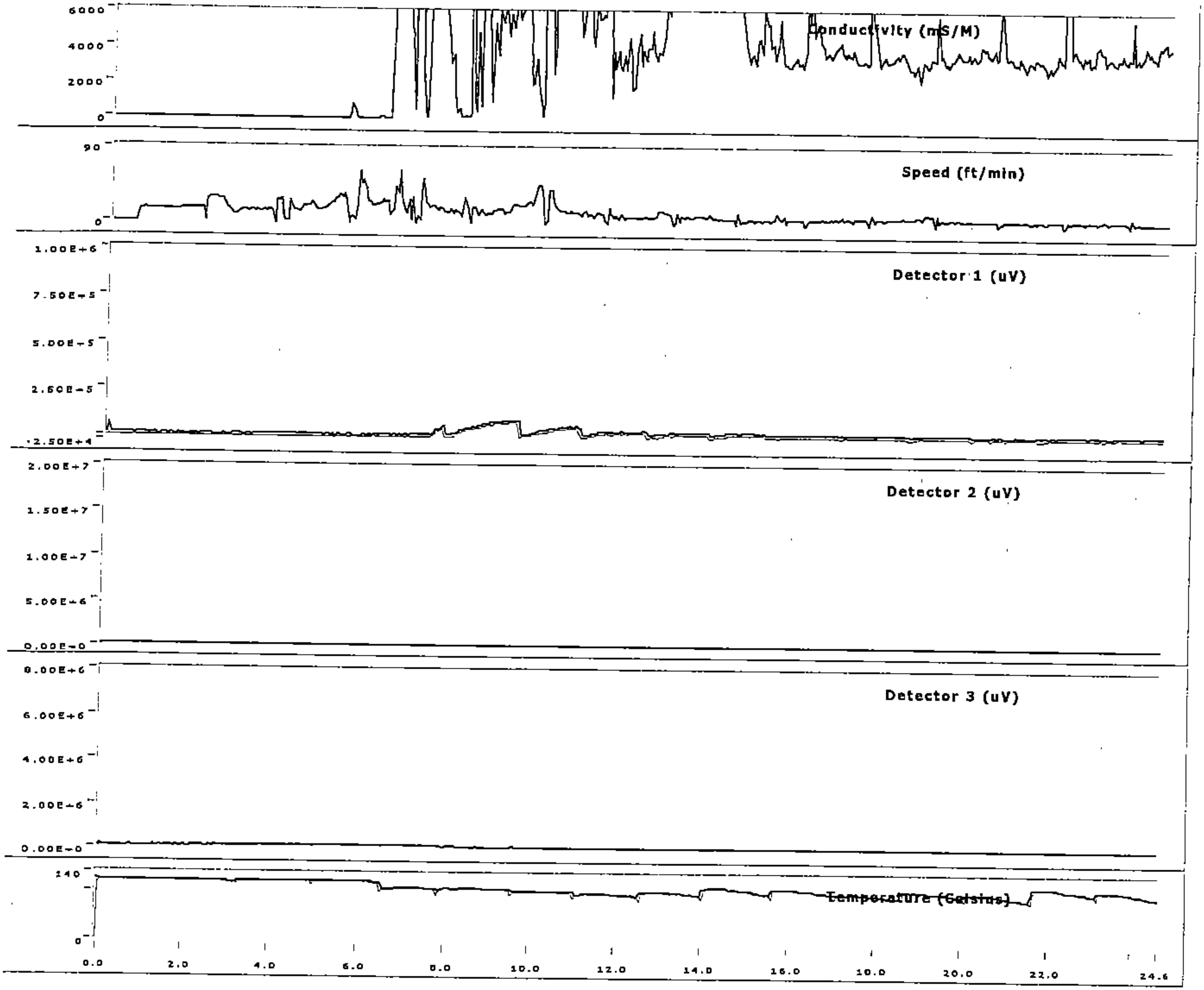

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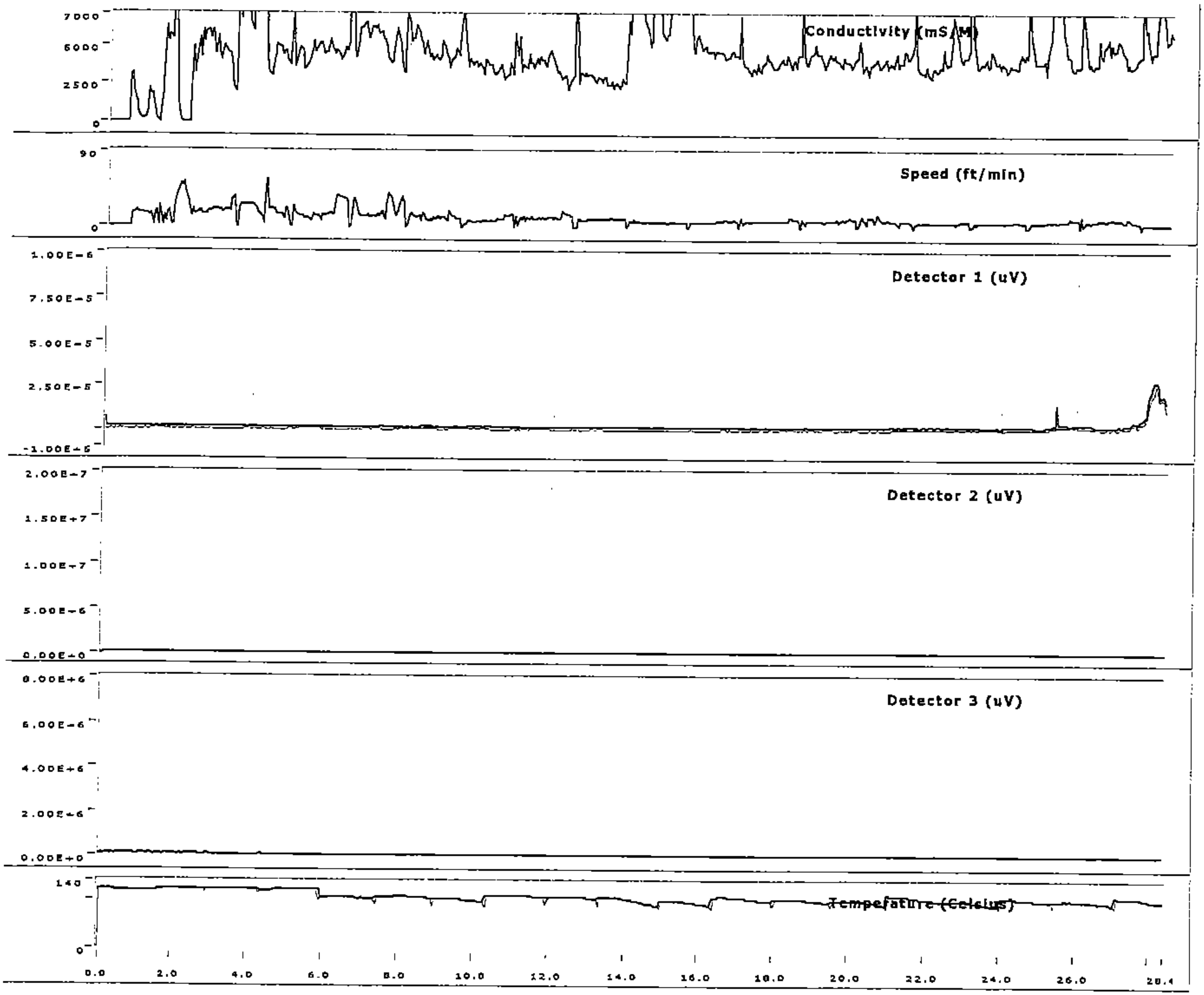

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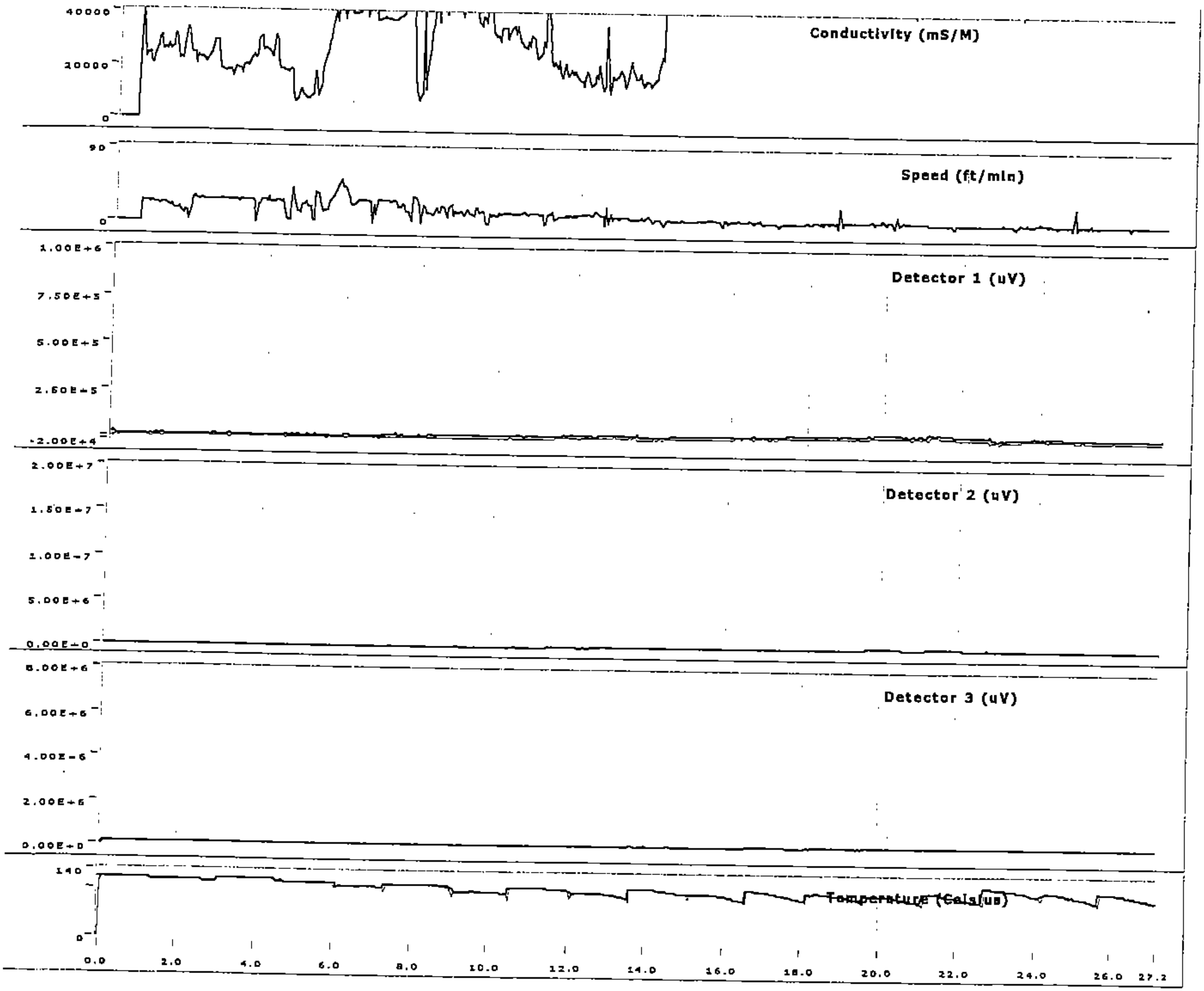

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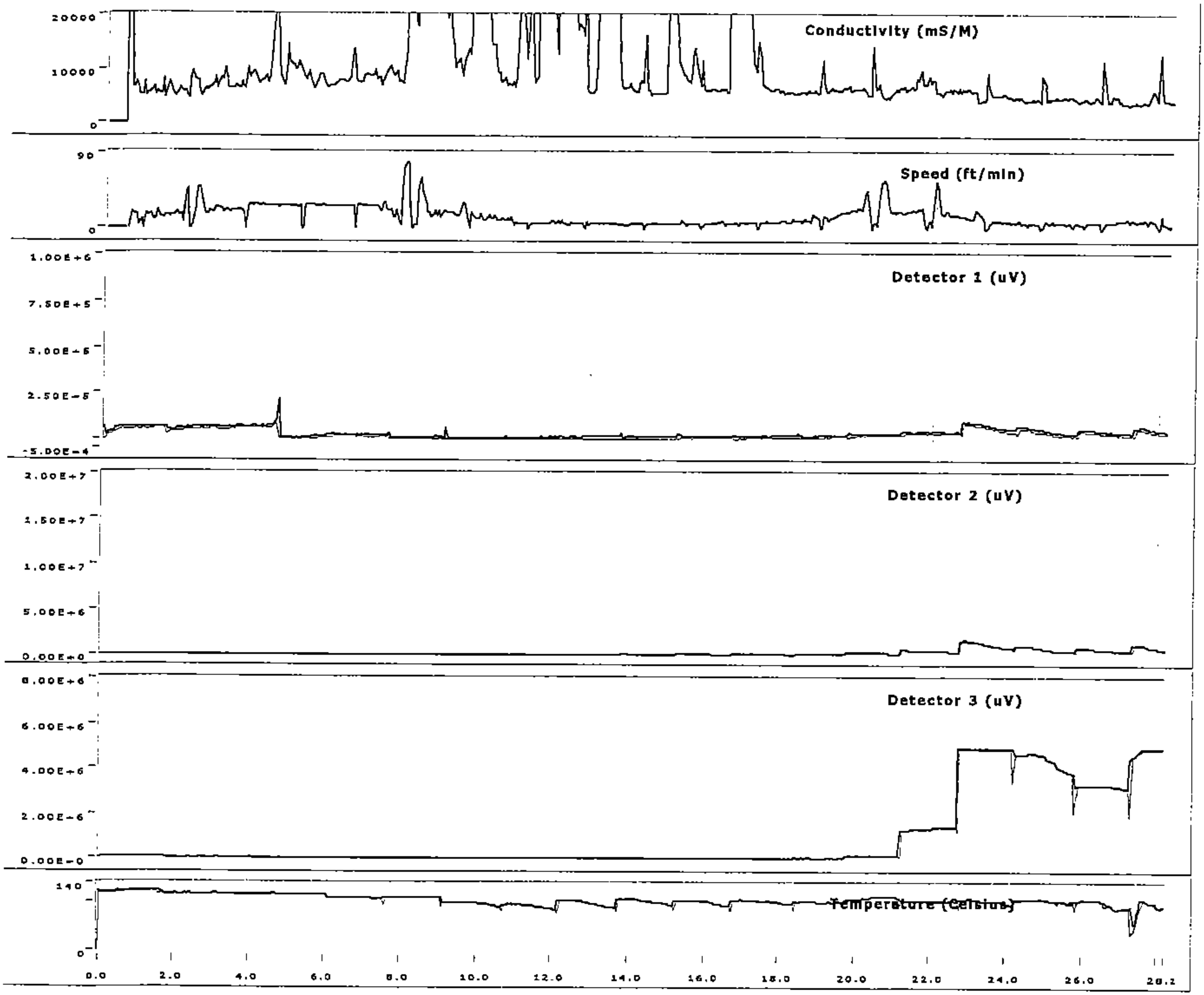

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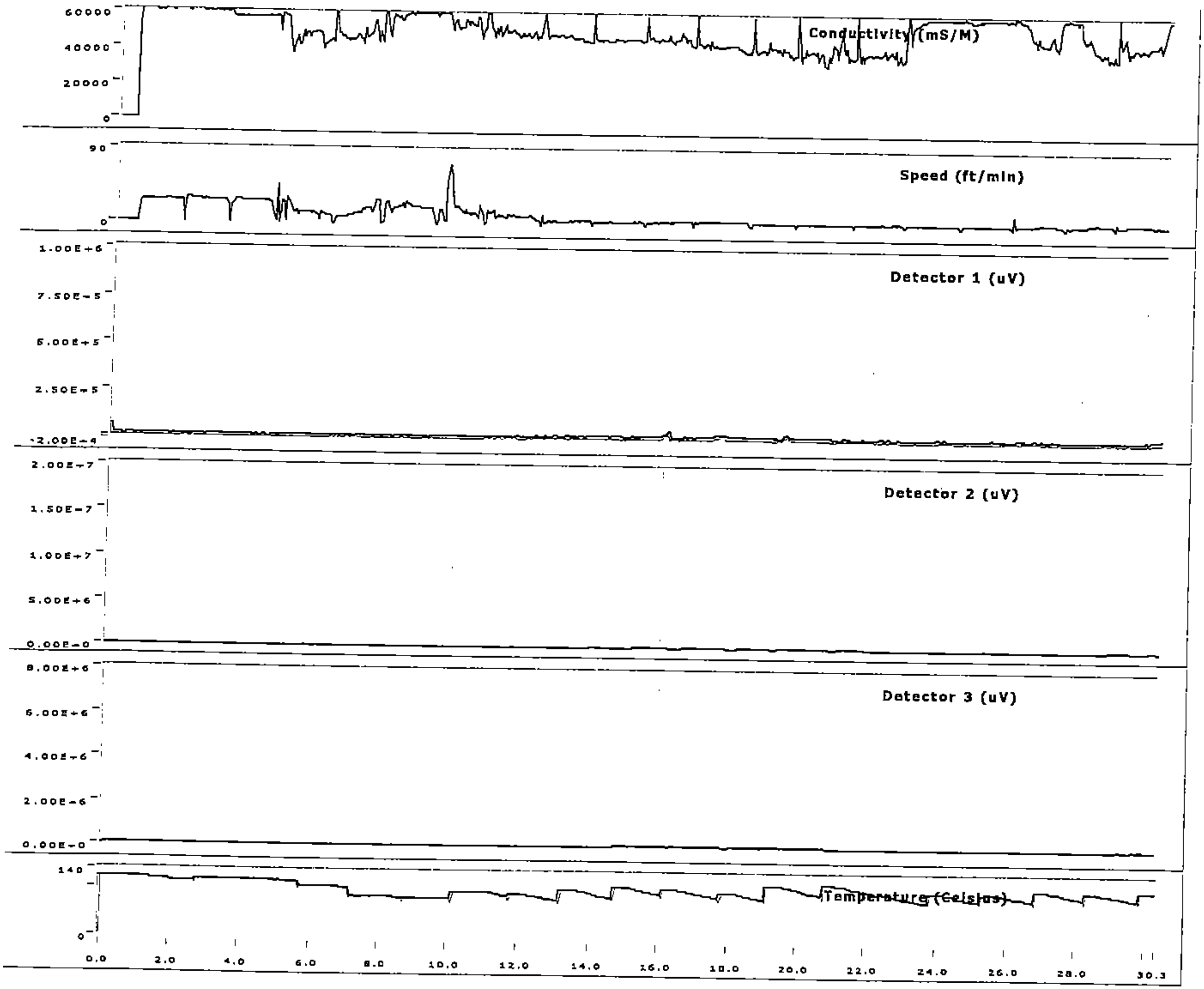

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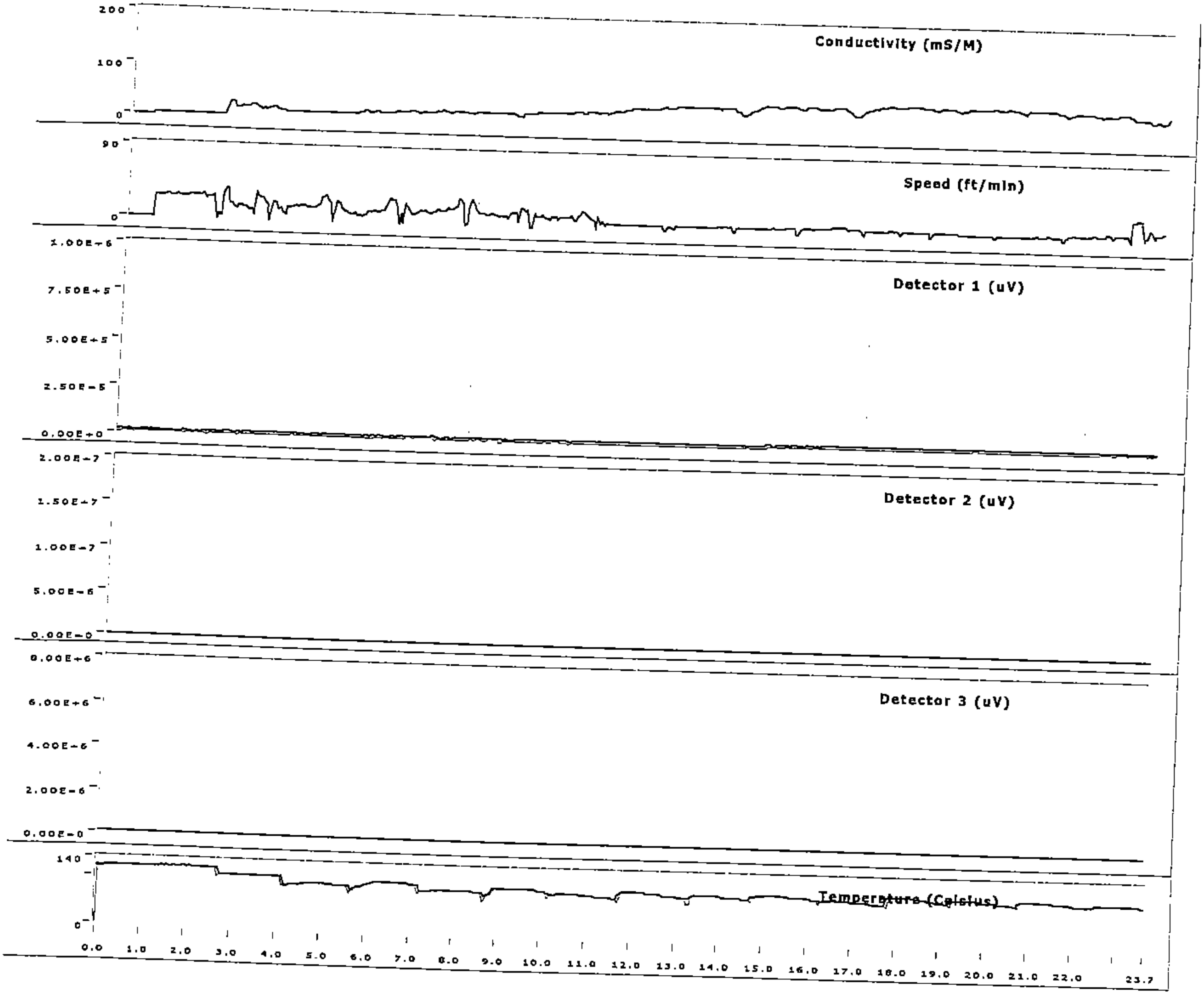

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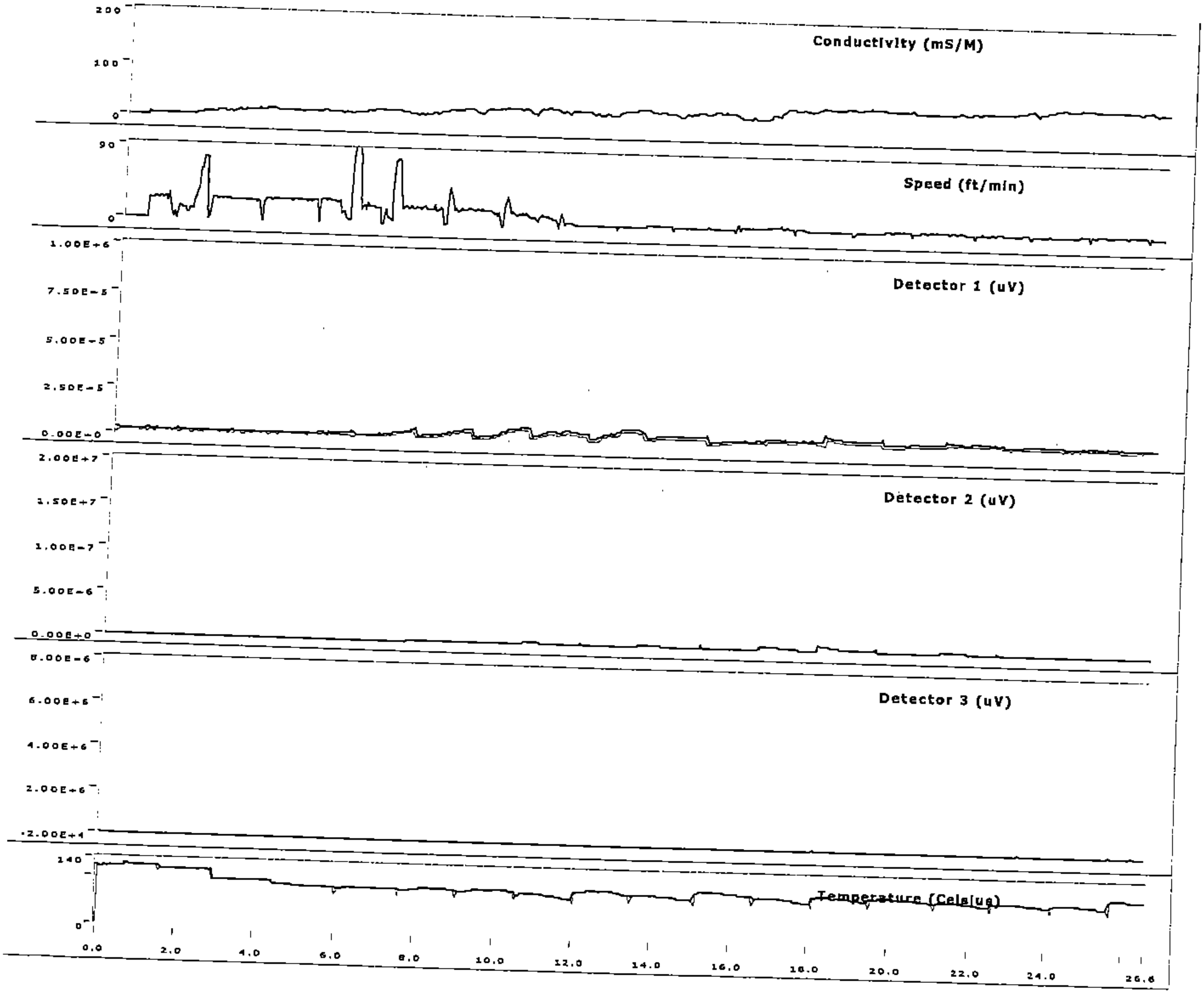

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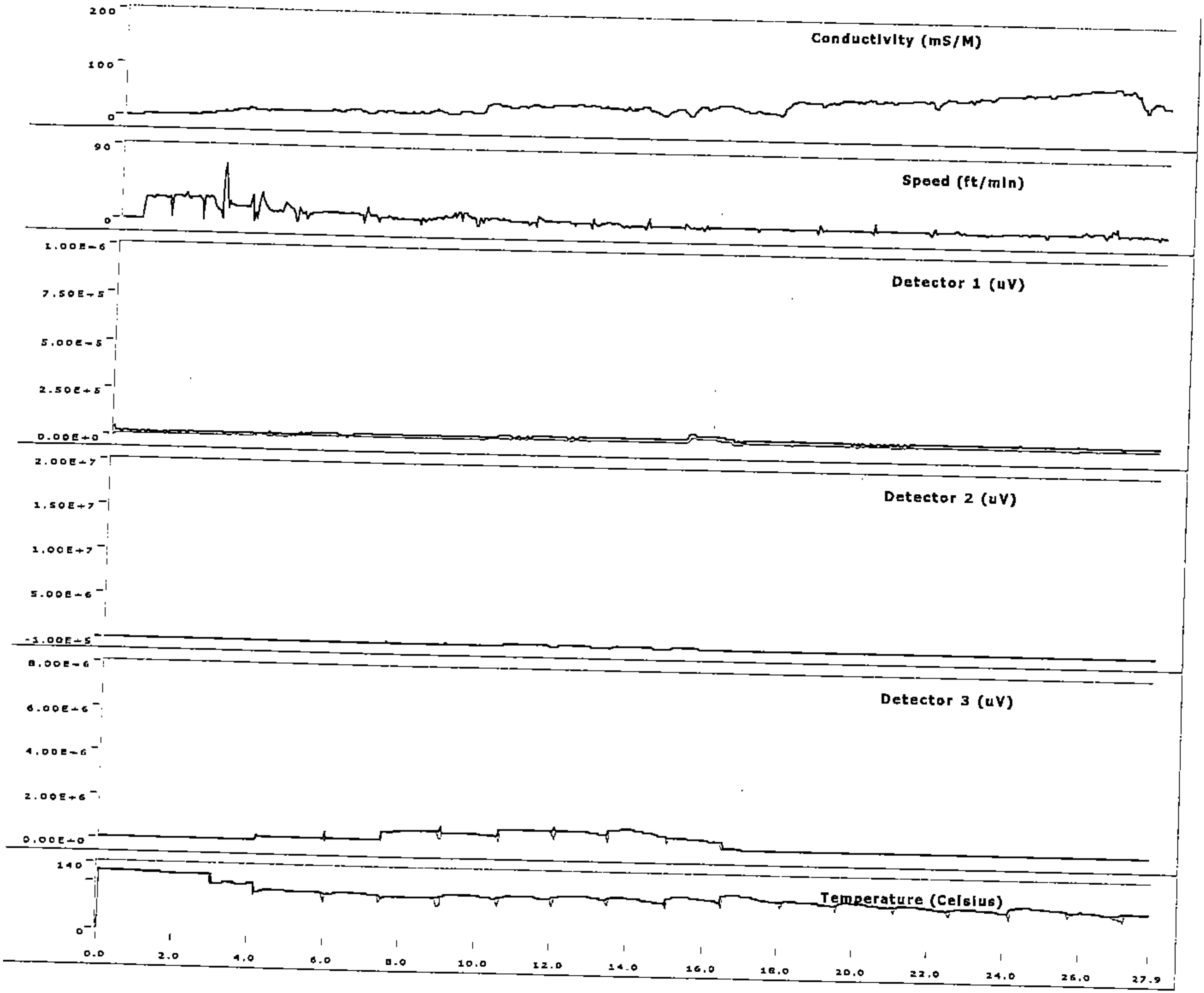

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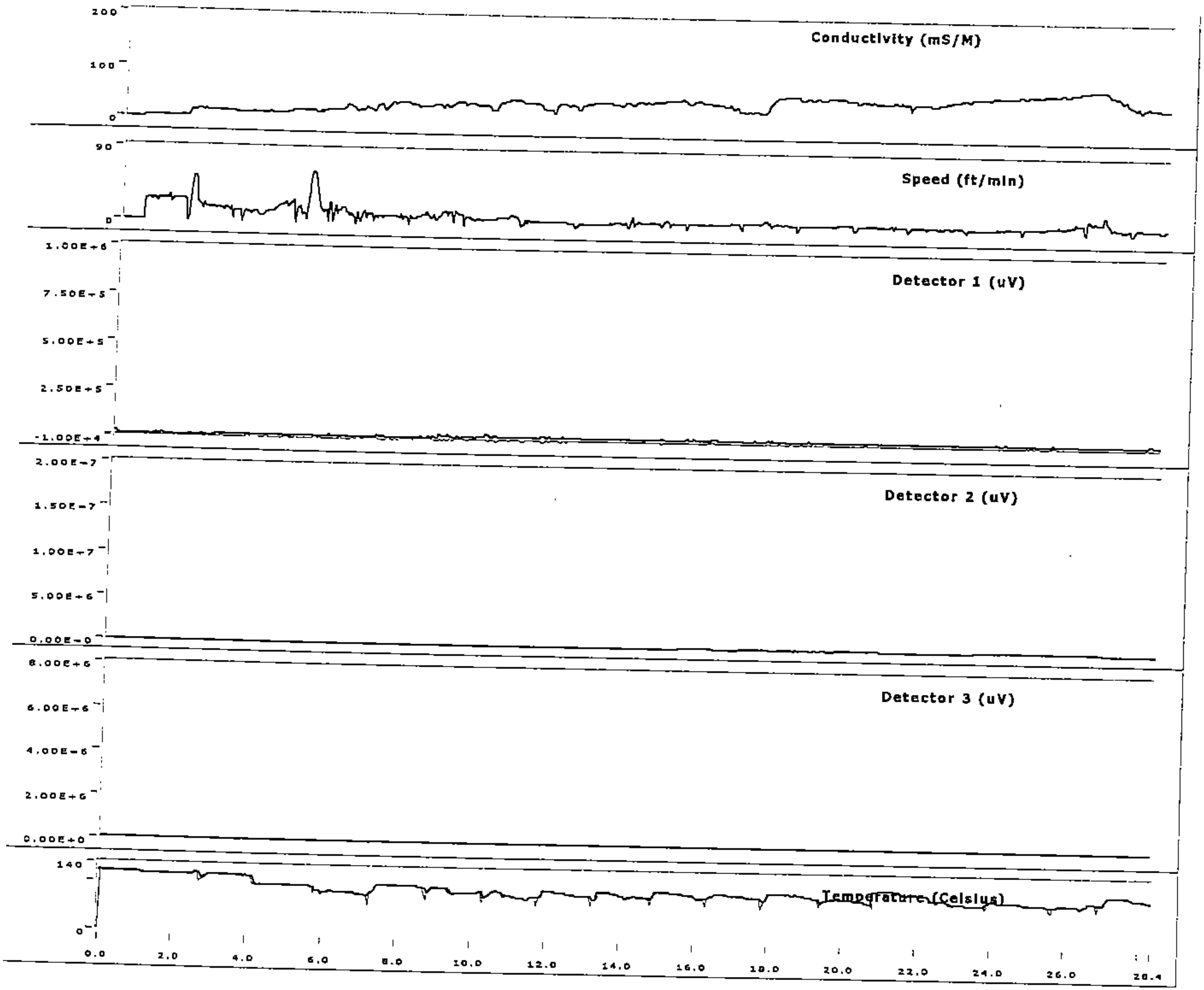

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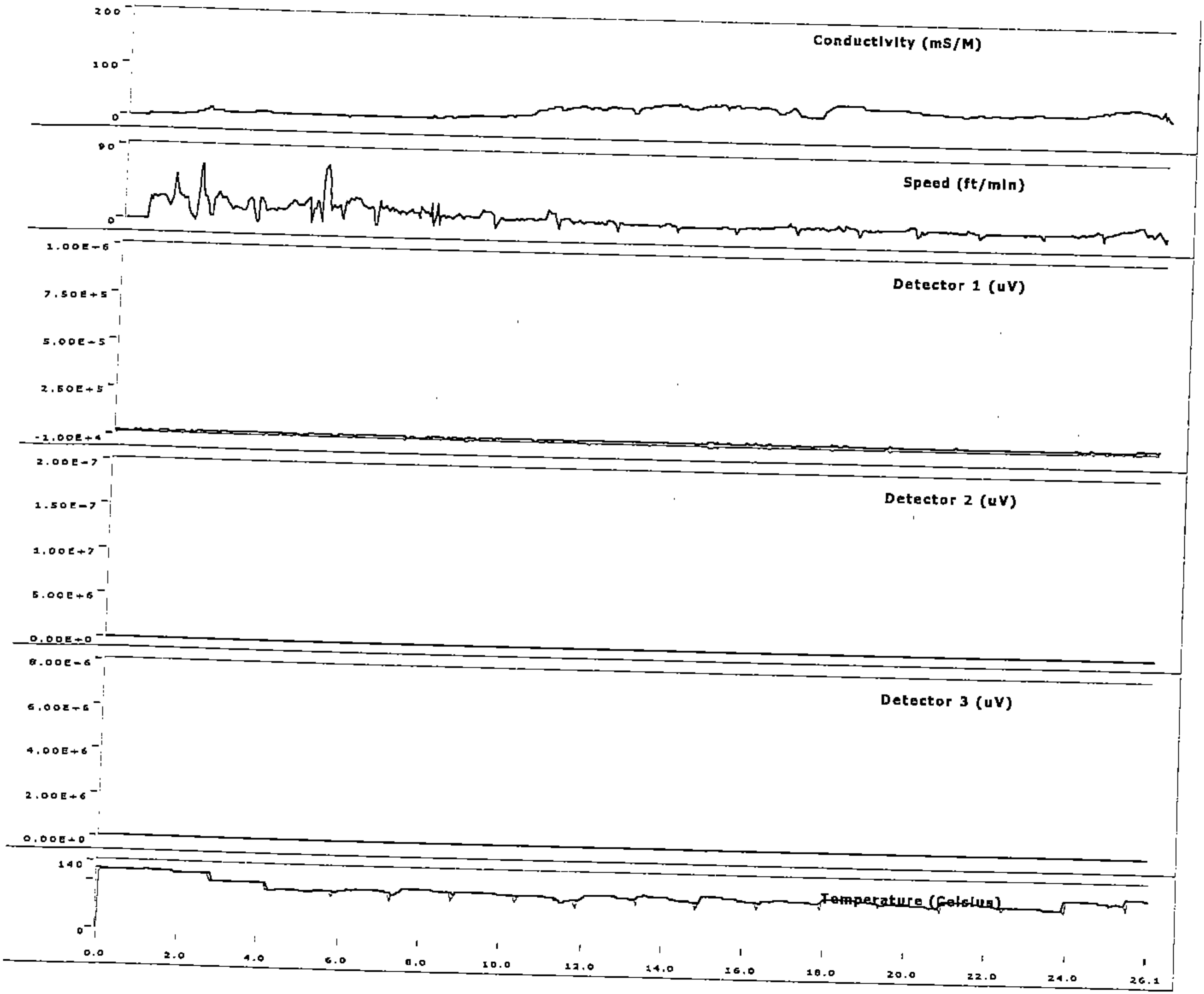

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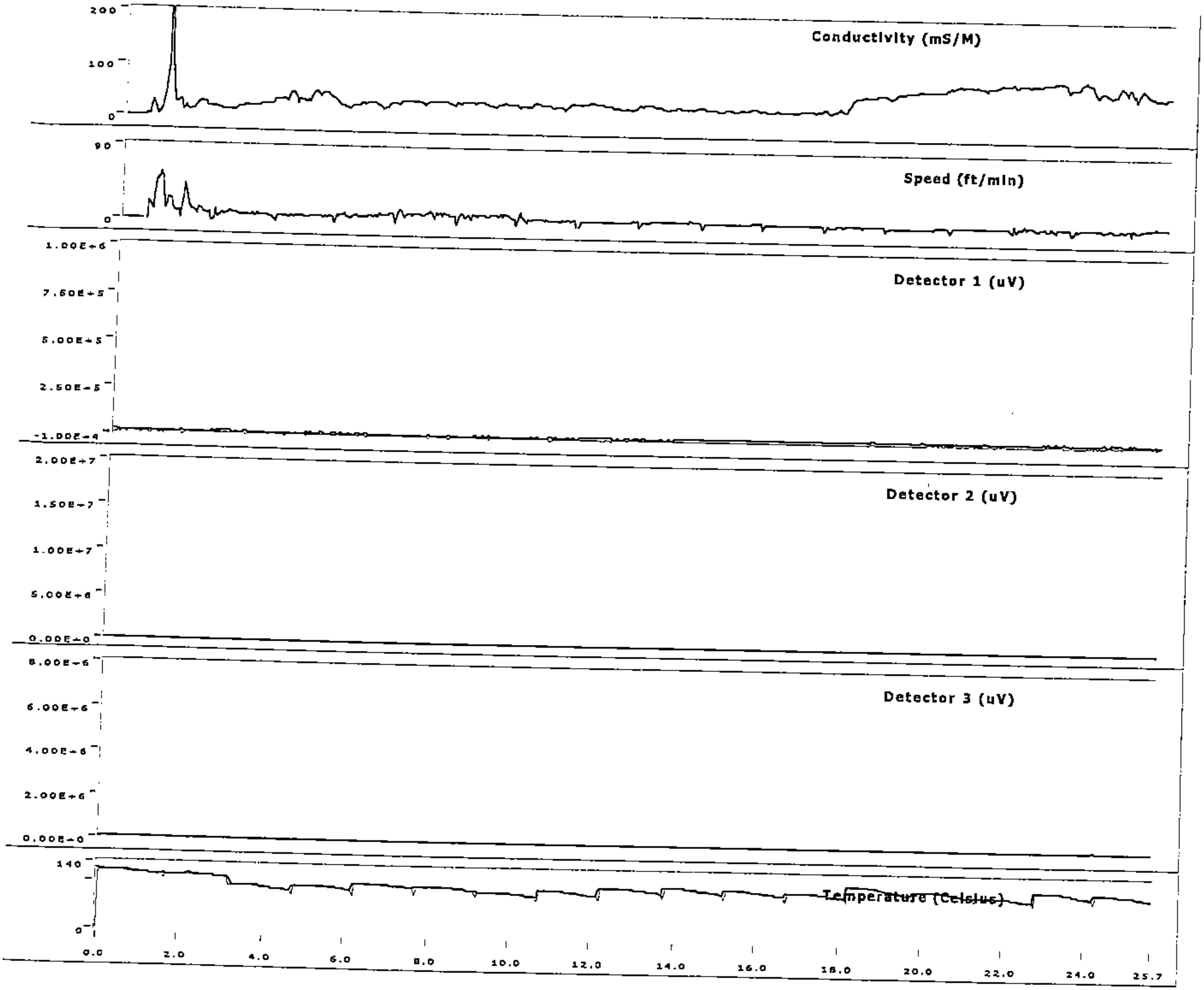

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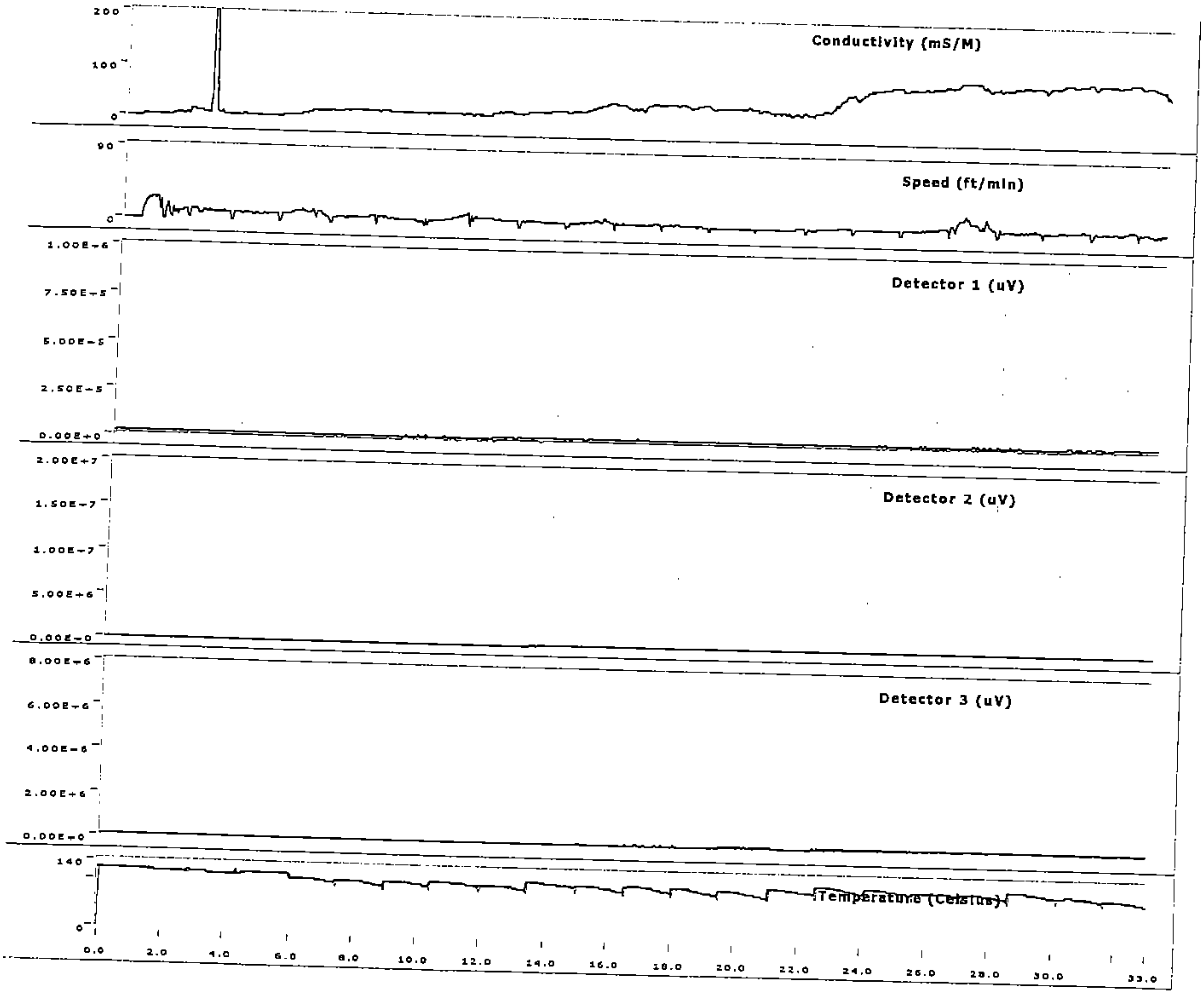

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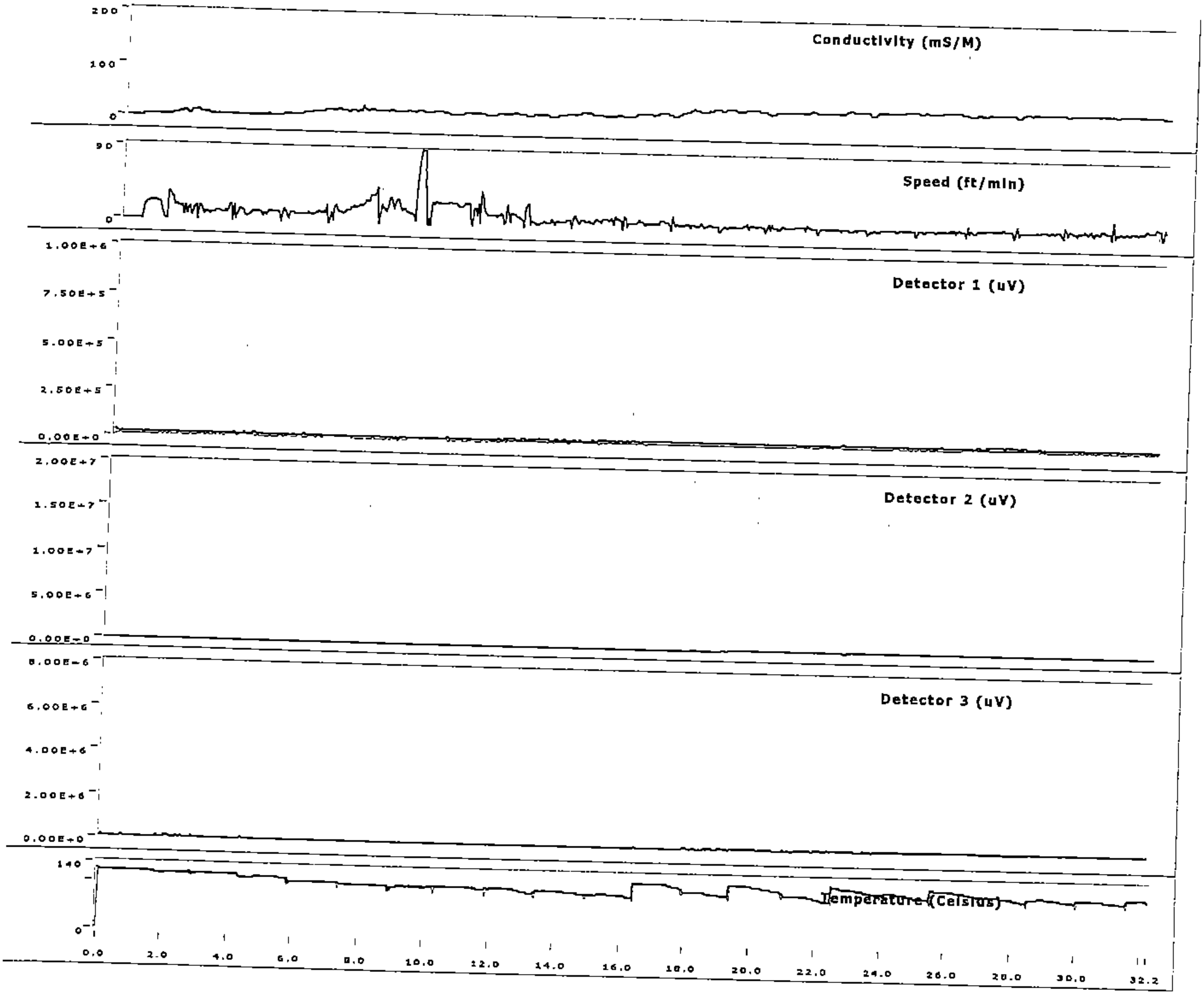

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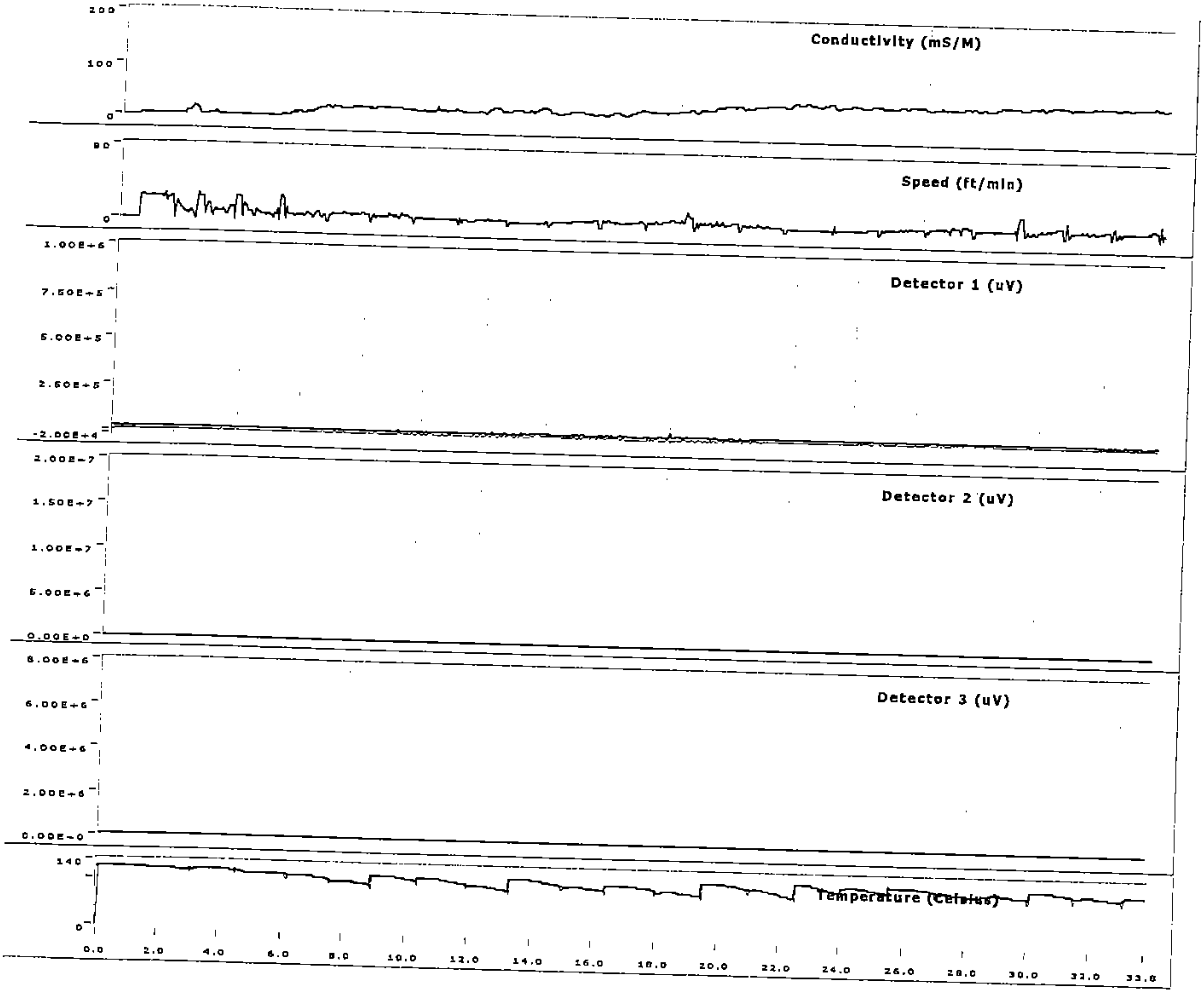

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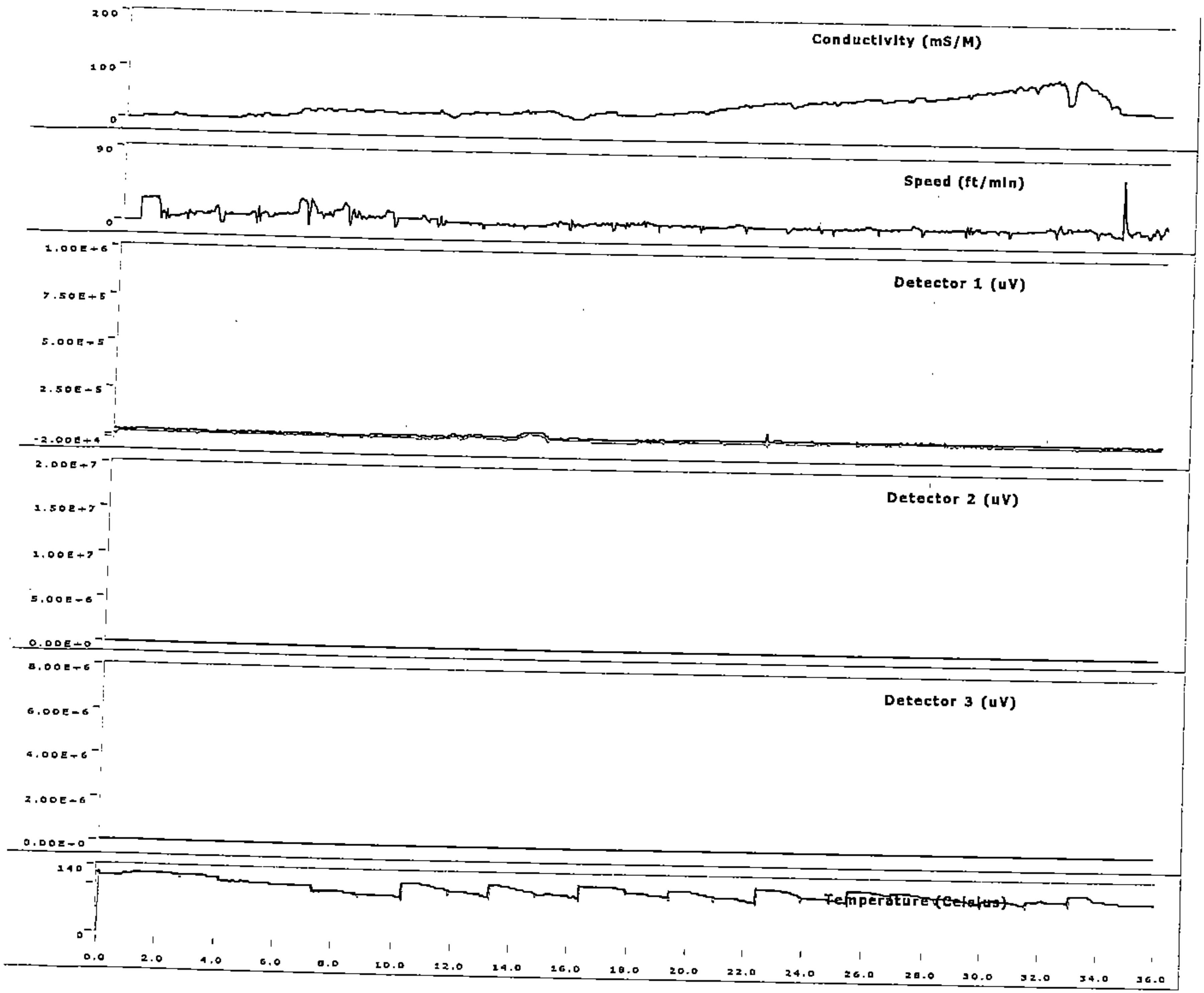


In Situ Field Hydraulic Conductivity Testing OMC Plant 2 (Operable Unit 4), Waukegan, Illinois WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR: USEPA

PREPARED BY: CH2M HILL

DATE: October 13, 2005

Introduction

This memorandum documents the activities associated with the in situ hydraulic testing (slug testing) completed as part of the Remedial Investigation (RI) at the Outboard Marine Corporation (OMC) Plant 2 site in Waukegan, Illinois. The testing was completed on May 9 and 10, 2005.

This memorandum includes the following:

- Description of specific field activities performed, including locations and methodology.
- Data evaluation methodology and a summary of the hydraulic conductivity results and method parameters (Table 1).
- Slug Test Reports (Attachment 1).

Investigation Activities

Slug testing of the newly installed monitoring wells was performed to determine the site-specific hydraulic conductivity of the aquifer beneath the site. The testing was conducted in accordance with procedures presented in ASTM standard D 4044 – 96, *Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers* (1996).

Equipment and Materials

A water level indicator was used to measure water depth from the top of casing (TOC) before the testing. A 1-inch-diameter polyvinyl chloride (PVC) slug with a known volume was used to displace water within the monitoring well. The changes in water level were measured using a pressure transducer, which was connected to a data logger. The slug and associated equipment were decontaminated between locations. Field instruments were evaluated daily and removed from service if performance issues were observed.

Slug Testing Procedures

Slug testing was performed at all of the monitoring well locations installed during the RI. The slug testing method involves stressing the aquifer through an instantaneous displacement of water (with a slug) and subsequently measuring the water level response in the well over time. Rising and falling head slug tests were performed based on field conditions (depth to water in monitoring well in reference to screened interval) and to determine aquifer response to different stress conditions. A falling head slug test was conducted by producing a rise in the water level and monitoring the water level decline. A rising head slug test was conducted by producing a drop in the water level and monitoring the water level rise. Both tests accomplished the rise or fall in head through insertion/ removal of a solid PVC cylinder of known volume into/from the water column and recording the change in head information with a pressure transducer.

Before testing, the water level in the well was measured and recorded to determine if the water level was above or within the screened interval of the well. If the top of the water table was found to be above the top of the screen, a falling-head slug test, followed by a rising head test, was performed. If the top of the water table was below the top of the screen, then two rising-head slug tests were performed.

Upon measuring the water level, a pressure transducer was lowered into the water column and kept approximately 2 inches from the bottom of the well. The water level in the well was allowed to stabilize. A head change was induced by rapidly inserting the PVC slug into the well (falling head test) or removing the PVC slug from below the water surface (rising head test). In response to the slug, the water level within the well rose or declined an amount equal to the volume of the slug. A pressure transducer and data logger were used to automatically record the water level responses at predetermined time intervals. The test was continued until the water levels returned to static water levels (water levels measured prior to the start of the test) or minimal changes in water levels (less than 0.1 foot) were measured.

Data Evaluation Activities

The water level drawdown/recovery data were recorded by the data logger and downloaded to a computer. The water level data versus time were graphed on semi-logarithmic paper (drawdown on the logarithmic axis) (Attachment 2). Analysis involves matching a straight-line solution to water-level displacement data collected during a slug test. Graphs were analyzed with the software program Aqtesolv™ utilizing the Bouwer-Rice method (Bouwer and Rice, 1976). All parameters and hydraulic test results are presented in Table 1. Well completion logs are located in Attachment 1.

References

D 4044 – 96, *Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers* (1996).

Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

TABLE 1

Slug Test Parameters and Result Summary

OMC Plant 2

Bouwer-Rice Method Parameters						Hydrolic Conductivity (cm/sec)						
Well ID	Radius of Well Casing (feet)	Radius of Borehole (feet)	Length of Well Screen (feet)	DTW (ft btoc)	Assumed Aquifer Thickness (feet)	Falling Head Test (attempt 1)	Falling Head Test (attempt 2)	Rising Head Test (attempt 1)	Rising Head Test (attempt 2)	Falling Head Average	Rising Head Average	Total Average
MW-500D	0.08612	0.333	5.0	4.06	30	3.22E-03		3.73E-03			3.73E-03	3.47E-03
MW-500S	0.08612	0.333	5.0	3.98	30			8.98E-02	5.66E-02		7.32E-02	7.32E-02
MW-501D	0.08612	0.333	5.0	5.23	30	2.88E-03		3.03E-03			3.03E-03	2.95E-03
MW-501S	0.08612	0.333	5.0	5.23	30			2.51E-02	5.92E-03		1.55E-02	1.55E-02
MW-502D	0.08612	0.333	5.0	4.68	30	5.82E-03		4.89E-03				5.35E-03
MW-502S	0.08612	0.333	5.0	4.79	30			3.93E-03	2.38E-02		1.39E-02	1.39E-02
MW-503D	0.08612	0.333	5.0	2.36	30	4.85E-03		NA				4.85E-03
MW-503S	0.08612	0.333	5.0	2.40	30			6.36E-03	5.91E-03		6.13E-03	6.13E-03
MW-504D	0.08612	0.333	5.0	6.05	30	3.78E-03		3.89E-03			3.89E-03	3.83E-03
MW-504S	0.08612	0.333	5.0	6.12	30			3.66E-02	3.44E-02		3.55E-02	3.55E-02
MW-505D	0.08612	0.333	5.0	5.46	30	5.39E-03		5.90E-03			5.90E-03	5.64E-03
MW-505S	0.08612	0.333	5.0	5.62	30			1.73E-02	1.76E-02		1.75E-02	1.75E-02
MW-506D	0.08612	0.333	5.0	5.94	30	5.18E-03		5.35E-03			5.35E-03	5.26E-03
MW-506S	0.08612	0.333	5.0	5.93	30			4.66E-02	4.79E-02		4.73E-02	4.73E-02
MW-507D	0.08612	0.333	5.0	4.52	30	3.28E-03	3.04E-03	3.13E-03		3.16E-03	3.13E-03	3.15E-03
MW-507S	0.08612	0.333	5.0	4.49	30			1.22E-02	1.14E-02		1.18E-02	1.18E-02
MW-508D	0.08612	0.333	5.0	3.68	30	3.44E-03		3.47E-03			3.47E-03	3.46E-03
MW-508S	0.08612	0.333	5.0	3.68	30			2.21E-02	2.15E-02		2.18E-02	2.18E-02
MW-509D	0.08612	0.333	5.0	1.18	30	6.94E-03	6.48E-03	7.33E-03	6.85E-03	6.71E-03	7.09E-03	6.90E-03
MW-509S	0.08612	0.333	5.0	1.21	30			1.51E-02	1.75E-02		1.63E-02	1.63E-02
MW-510D	0.08612	0.333	5.0	5.90	30	4.71E-03		4.77E-03			4.77E-03	4.74E-03
MW-510S	0.08612	0.333	5.0	5.88	30			1.12E-02	1.03E-02		1.07E-02	1.07E-02
MW-511D	0.08612	0.333	5.0	6.49	30	6.19E-03		3.16E-03			3.16E-03	4.67E-03
MW-511S	0.08612	0.333	5.0	6.44	30			1.08E-02	4.10E-02		2.59E-02	2.59E-02
MW-512D	0.08612	0.333	5.0	3.04	30	4.18E-03		4.33E-03			4.33E-03	4.26E-03
MW-512S	0.08612	0.333	5.0	3.01	30			1.10E-02	1.20E-02		1.15E-02	1.15E-02
MW-513D	0.08612	0.333	5.0	3.58	30		5.77E-03	6.28E-03	5.93E-03		6.10E-03	5.99E-03
MW-513S	0.08612	0.333	5.0	3.51	30			9.62E-02	9.55E-02		9.59E-02	9.59E-02
MW-514D	0.08612	0.333	5.0	3.42	30		7.46E-03	8.33E-03			8.33E-03	7.89E-03
MW-514S	0.08612	0.333	5.0	3.44	30			5.44E-02	1.11E-02		3.28E-02	3.28E-02
MW-515D	0.08612	0.333	5.0	2.28	30	4.17E-03		4.53E-03			4.53E-03	4.35E-03
MW-515S	0.08612	0.333	5.0	2.41	30			1.08E-02	1.12E-02		1.10E-02	1.10E-02
MW-516D	0.08612	0.333	5.0	3.72	30	2.20E-03		3.03E-03			3.03E-03	2.61E-03
MW-516S	0.08612	0.333	5.0	3.28	30			6.94E-02	7.28E-02		7.11E-02	7.11E-02
MW-517D	0.08612	0.333	5.0	4.29	30	6.28E-03	6.20E-03	6.58E-03	6.53E-03	6.24E-03	6.56E-03	6.40E-03
MW-517S	0.08612	0.333	5.0	4.21	30			1.15E-02	1.08E-02		1.12E-02	1.12E-02
											Geometric Mean Shall	2.16E-02
											Geometric Mean Dee	4.56E-03

Notes:

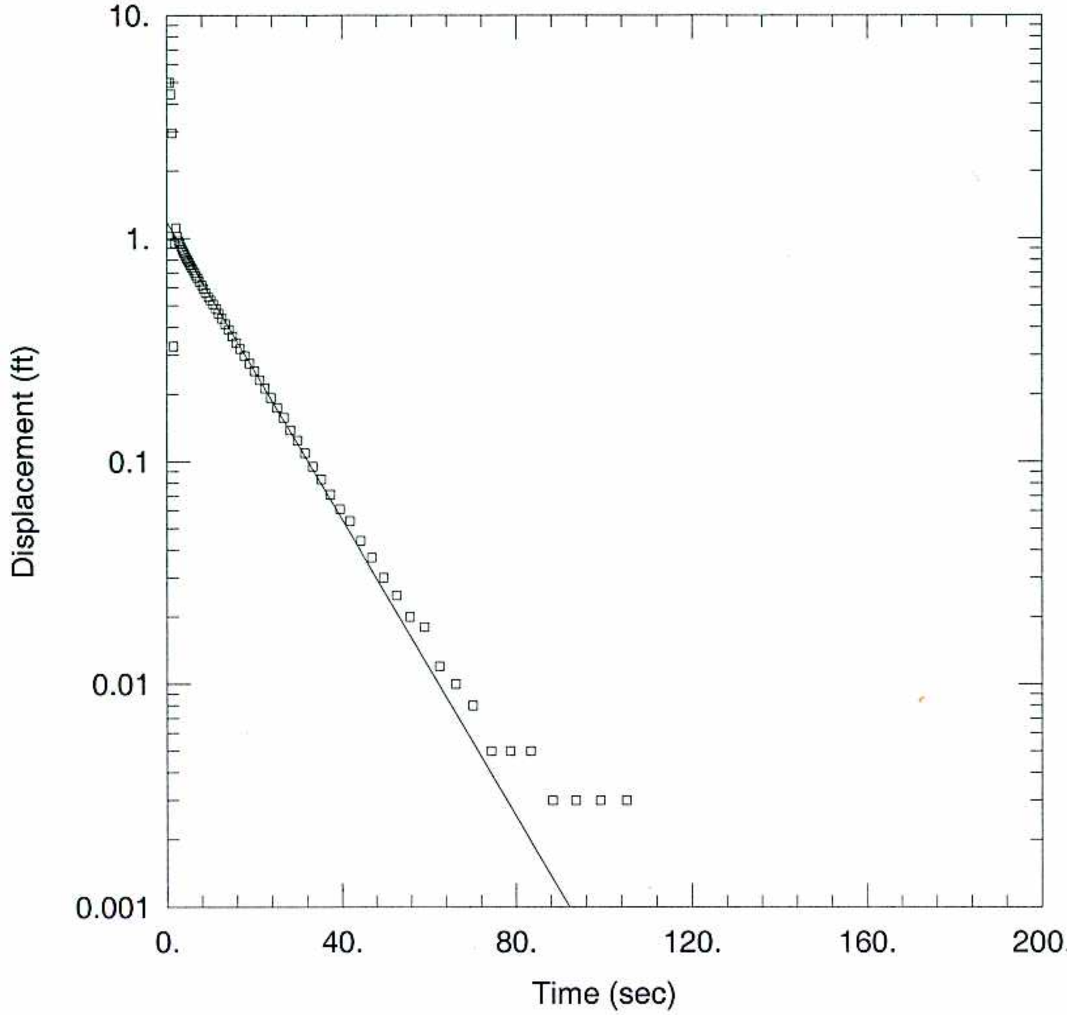
a. ft bgs = feet below ground surface.

b. ft btoc = feet below top of casing

c. NA = not available

Attachment 1

Slug Test Reports
OMC Plant 2—In Situ Field Hydrologic Conductivity Testing



WELL TEST ANALYSIS

Data Set: \...\MW-501D rising.aqt
Date: 10/13/05 Time: 15:43:51

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-510D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.7 ft Anisotropy Ratio (Kz/Kr): 1.

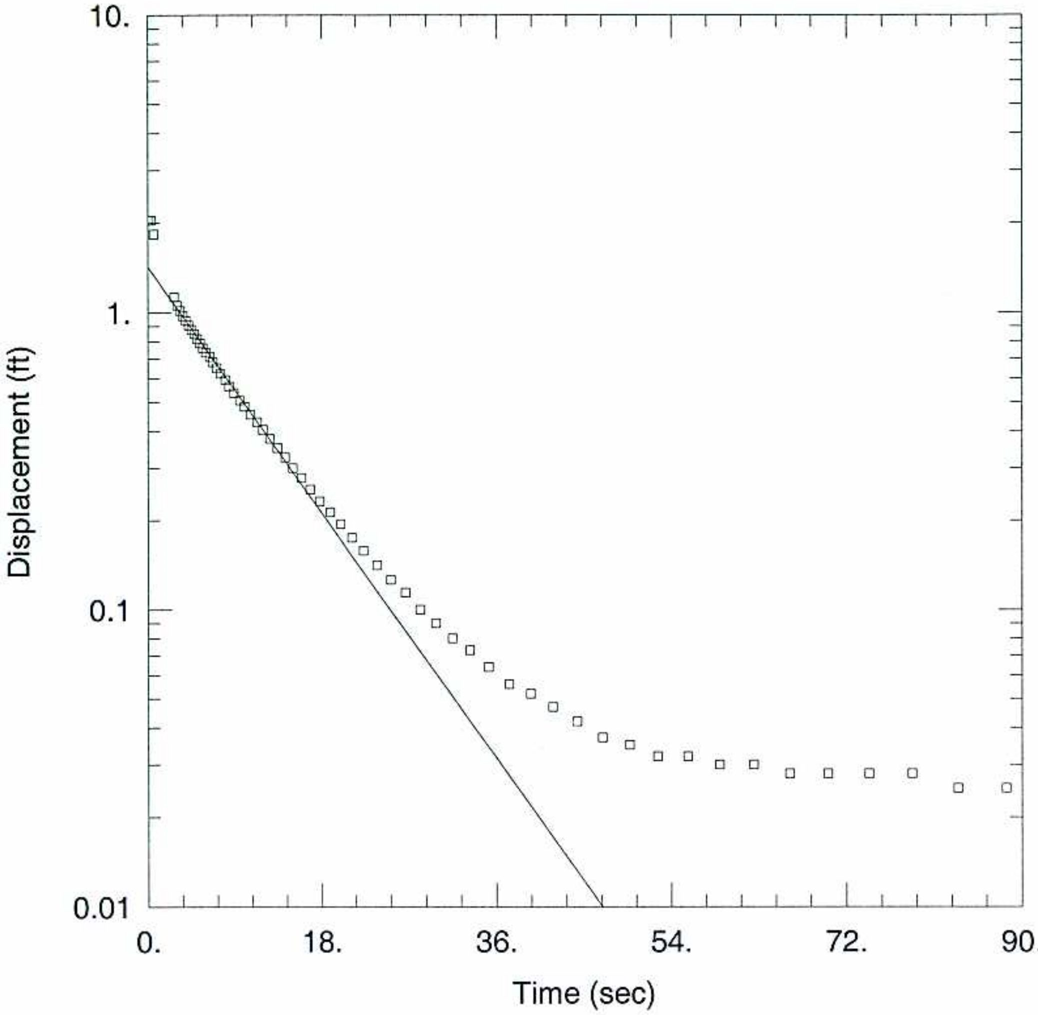
WELL DATA (MW-510D)

Initial Displacement: 4.995 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 21.7 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.004774 cm/sec y0 = 1.181 ft



WELL TEST ANALYSIS

Data Set: \...\MW-502S rising.aqt
Date: 10/13/05 Time: 15:44:39

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-502S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.5 ft
Anisotropy Ratio (Kz/Kr): 1.

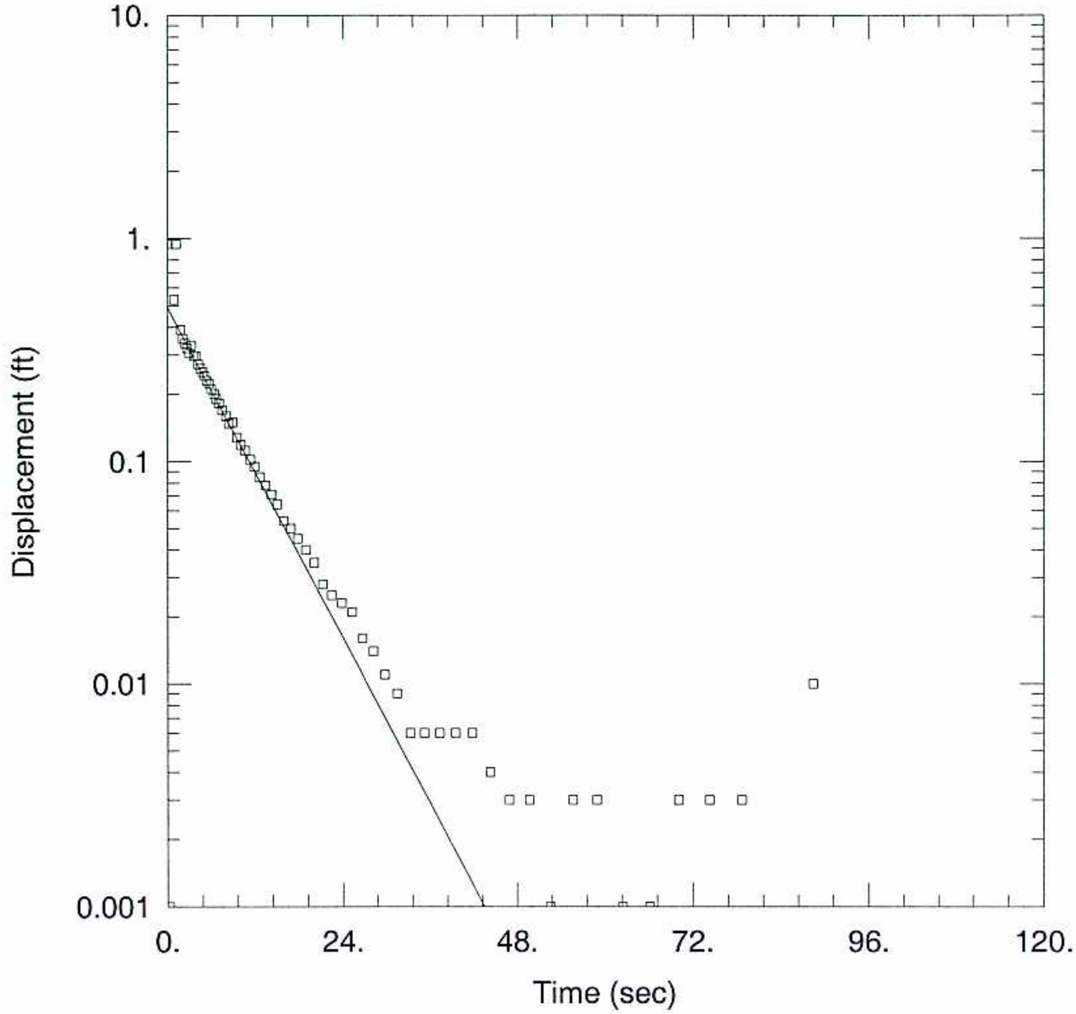
WELL DATA (MW-502S)

Initial Displacement: 2.038 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 5.39 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003933 cm/sec
y0 = 1.422 ft



WELL TEST ANALYSIS

Data Set: \...\MW-502S rising2.aqt
Date: 10/13/05 Time: 15:44:30

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-502S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.5 ft Anisotropy Ratio (Kz/Kr): 1.

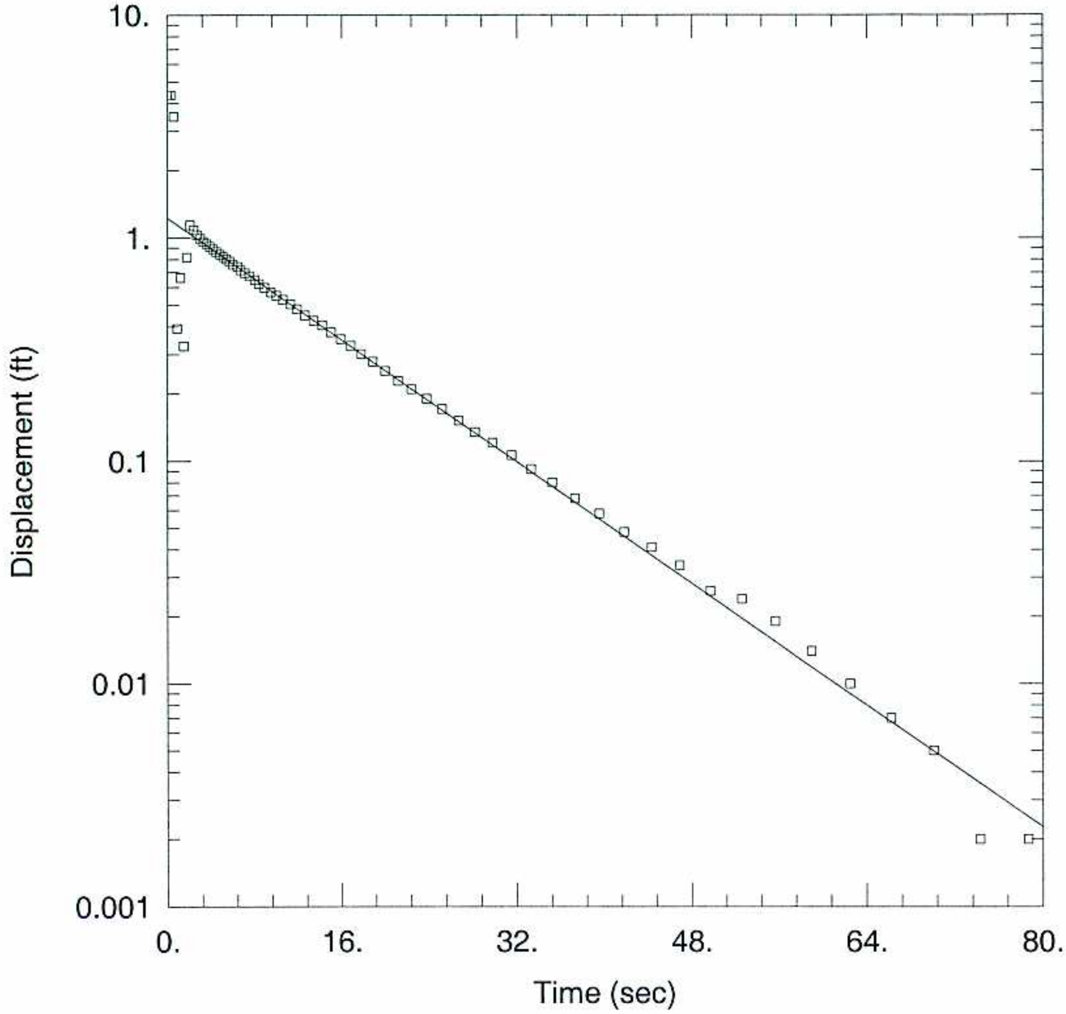
WELL DATA (MW-502S)

Initial Displacement: 0.941 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 5.39 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.02377 cm/sec $y0 = 0.4887$ ft



WELL TEST ANALYSIS

Data Set: \...\MW-502D Rising.aqt
Date: 10/13/05 Time: 15:44:22

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-502D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.5 ft
Anisotropy Ratio (Kz/Kr): 1.

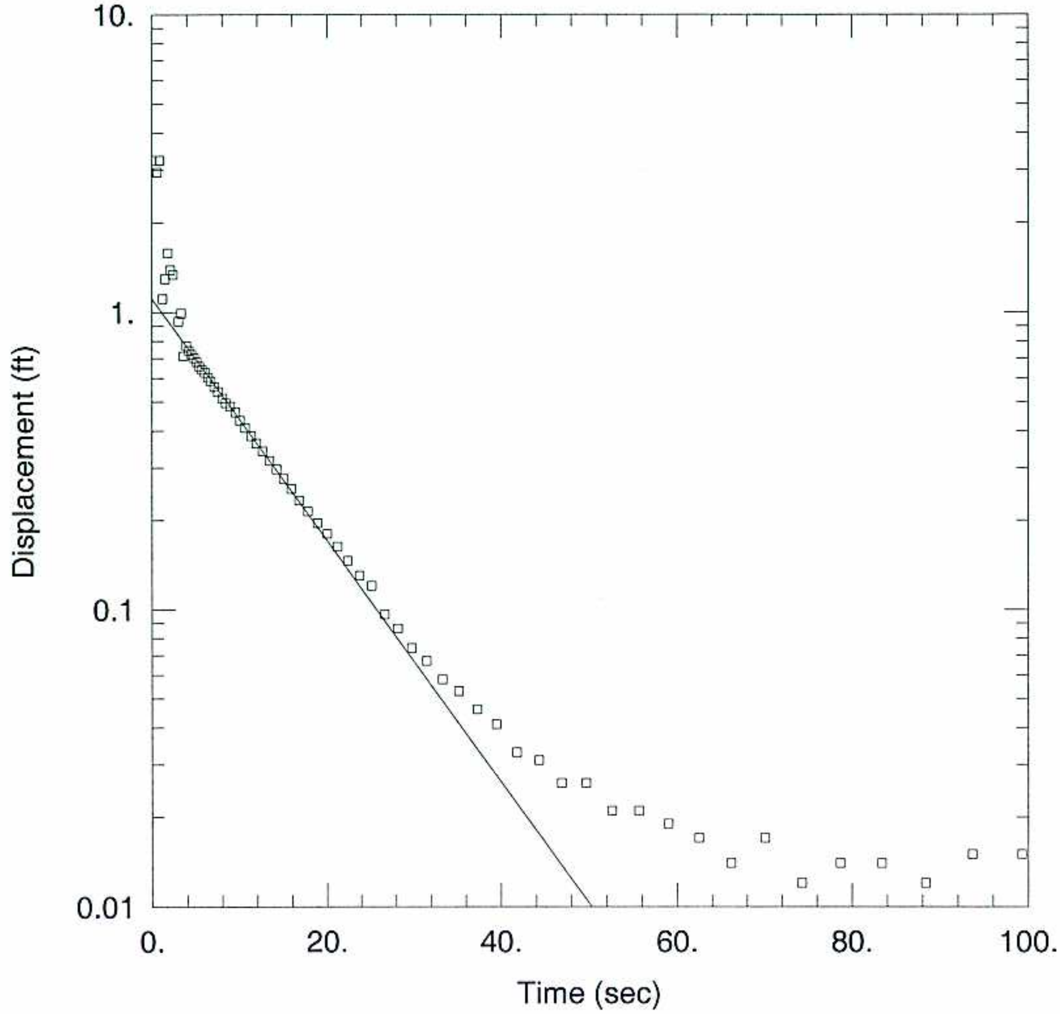
WELL DATA (MW-502D)

Initial Displacement: 4.362 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 21.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.004885 cm/sec
y0 = 1.225 ft



WELL TEST ANALYSIS

Data Set: \...\MW-502D Falling.aqt
Date: 10/13/05 Time: 15:44:14

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-502D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.5 ft Anisotropy Ratio (Kz/Kr): 1.

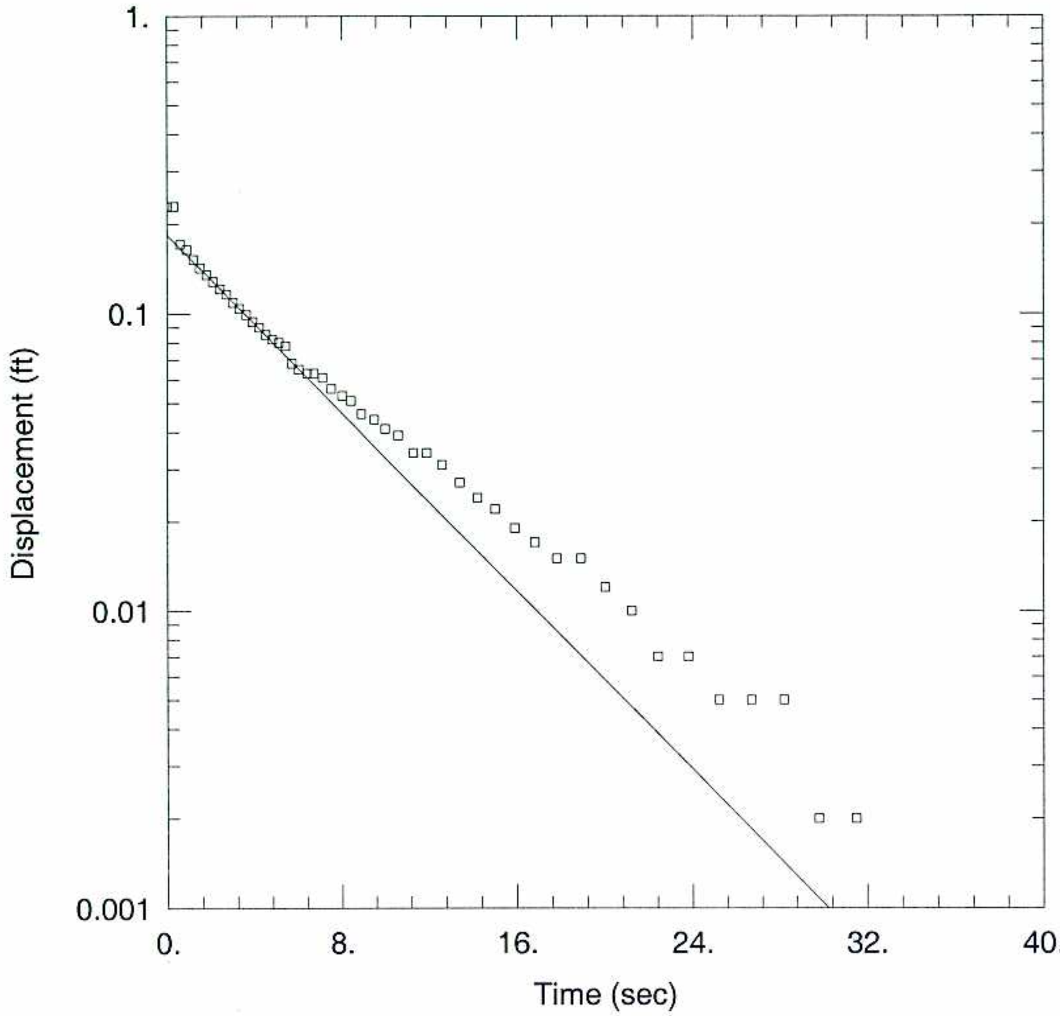
WELL DATA (MW-502D)

Initial Displacement: 3.233 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 21.5 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005817 cm/sec y0 = 1.11 ft



WELL TEST ANALYSIS

Data Set: \...\MW-503S Rising.aqt
Date: 10/13/05 Time: 15:46:01

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-503S
Test Date: 05-09-2005

AQUIFER DATA

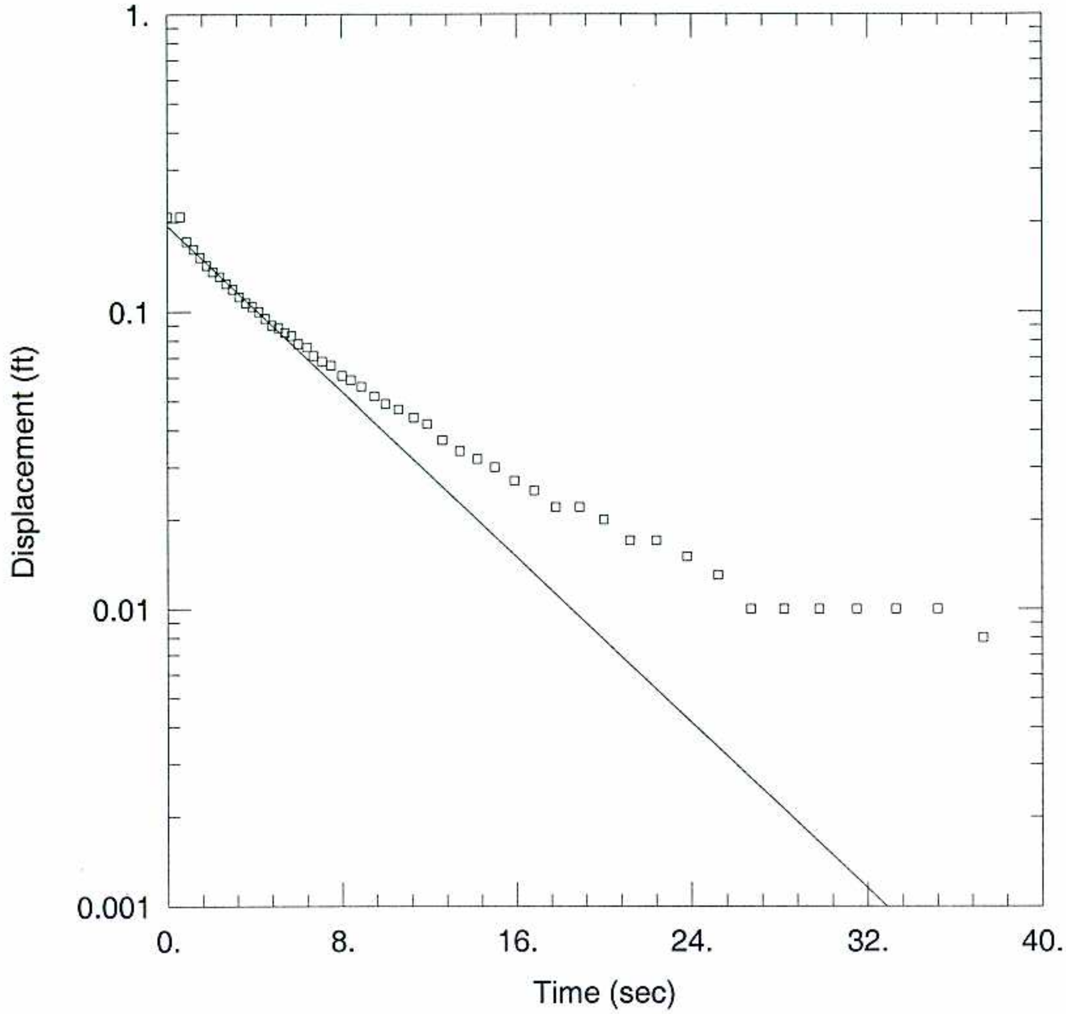
Saturated Thickness: 23.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-503S)

Initial Displacement: 0.229 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 5.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.006355 cm/sec
y0 = 0.1838 ft



WELL TEST ANALYSIS

Data Set: \...\MW-503S Rising2.aqt
Date: 10/13/05   Time: 15:45:56

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-503S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.3 ft   Anisotropy Ratio (Kz/Kr): 1.

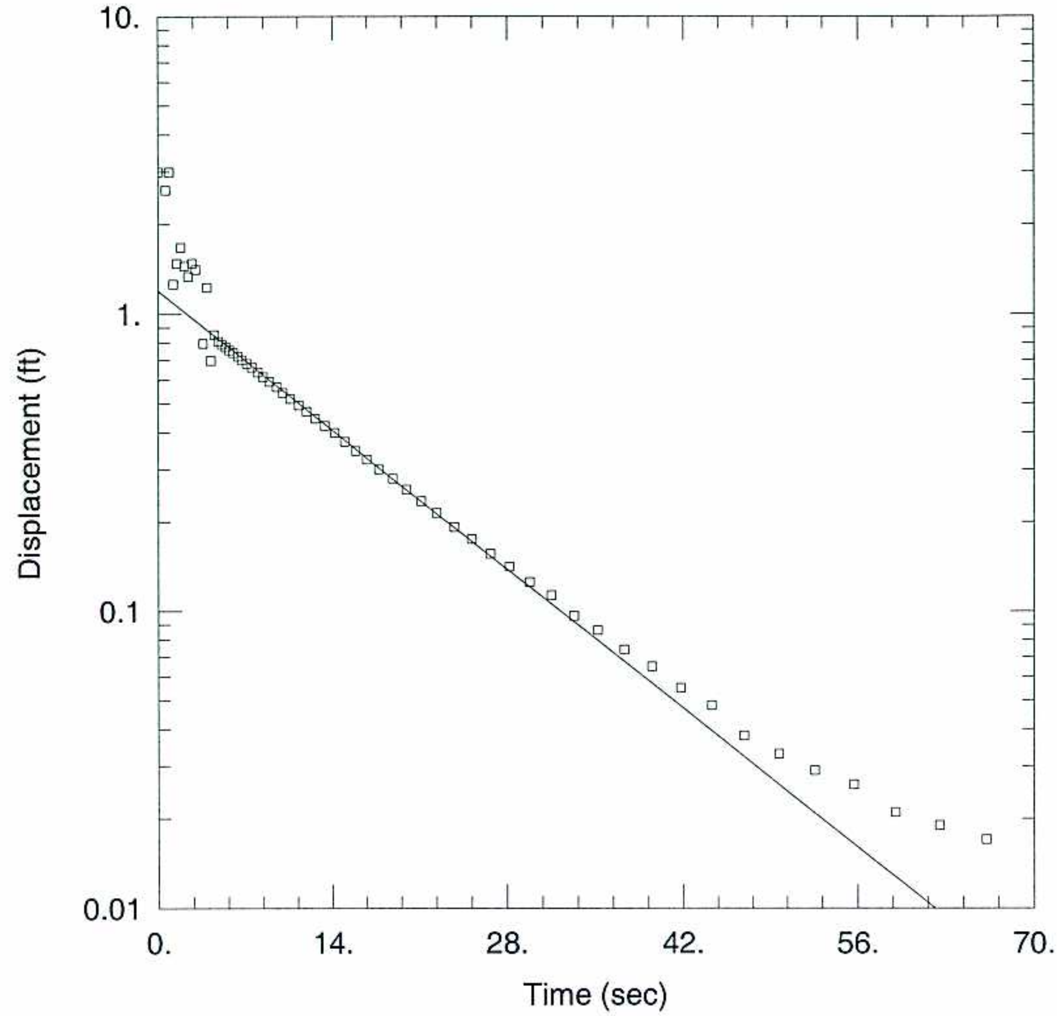
WELL DATA (MW-503S)

Initial Displacement: 0.208 ft   Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft   Well Skin Radius: 0.333 ft
Screen Length: 5. ft   Total Well Penetration Depth: 5.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined   Solution Method: Bouwer-Rice

K = 0.005907 cm/sec   y0 = 0.1943 ft



WELL TEST ANALYSIS

Data Set: \...\MW-503D Falling.aqt
Date: 10/13/05 Time: 15:44:47

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-503D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.3 ft Anisotropy Ratio (Kz/Kr): 1.

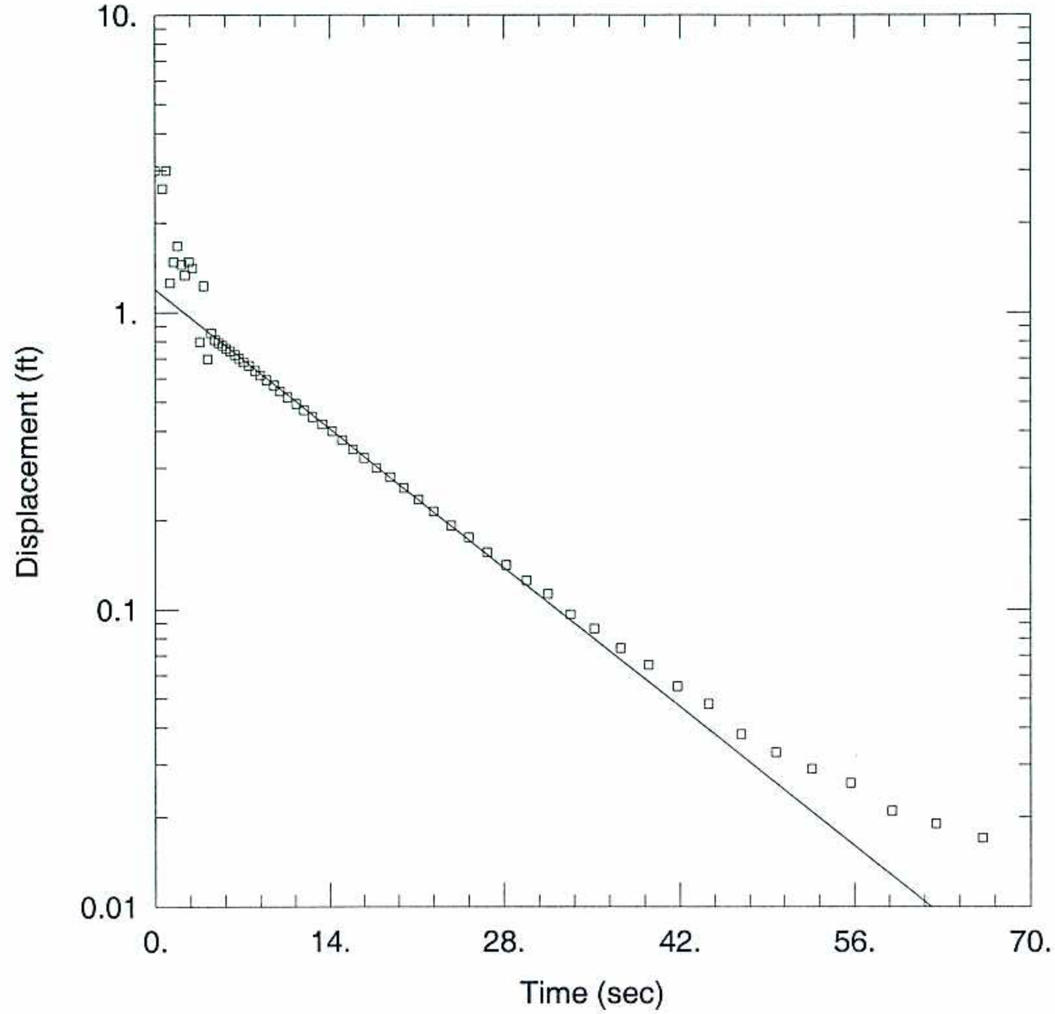
WELL DATA (MW-503D)

Initial Displacement: 2.994 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 23.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00485 cm/sec y0 = 1.193 ft



WELL TEST ANALYSIS

Data Set: \...\MW-503D Falling.aqt
Date: 10/13/05 | Time: 15:45:50

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-503D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.3 ft | Anisotropy Ratio (Kz/Kr): 1.

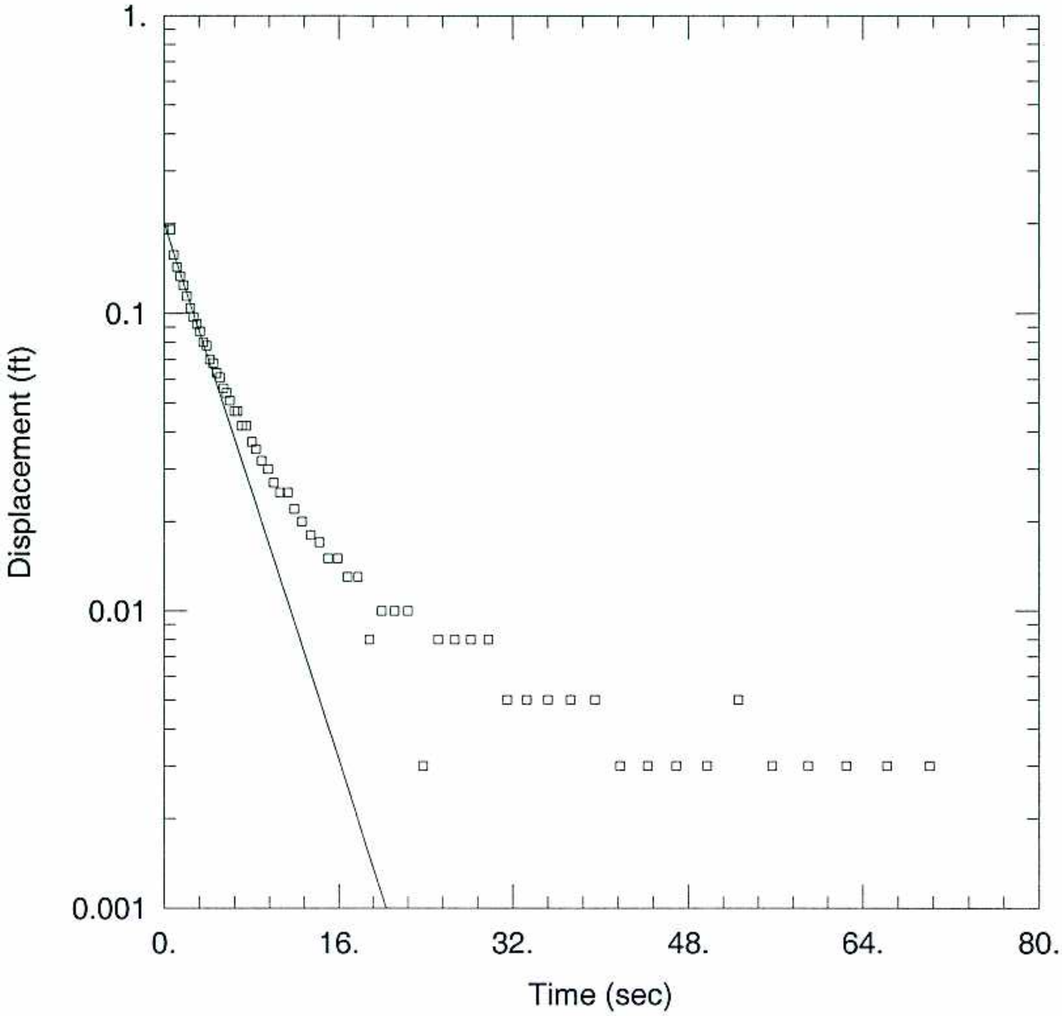
WELL DATA (MW-503D)

Initial Displacement: 2.994 ft | Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft | Well Skin Radius: 0.333 ft
Screen Length: 5. ft | Total Well Penetration Depth: 23.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined | Solution Method: Bouwer-Rice

K = 0.00485 cm/sec | y0 = 1.193 ft



WELL TEST ANALYSIS

Data Set: \...\MW-504S rising.aqt
Date: 10/13/05 — Time: 15:46:27

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-504S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft — Anisotropy Ratio (Kz/Kr): 1.

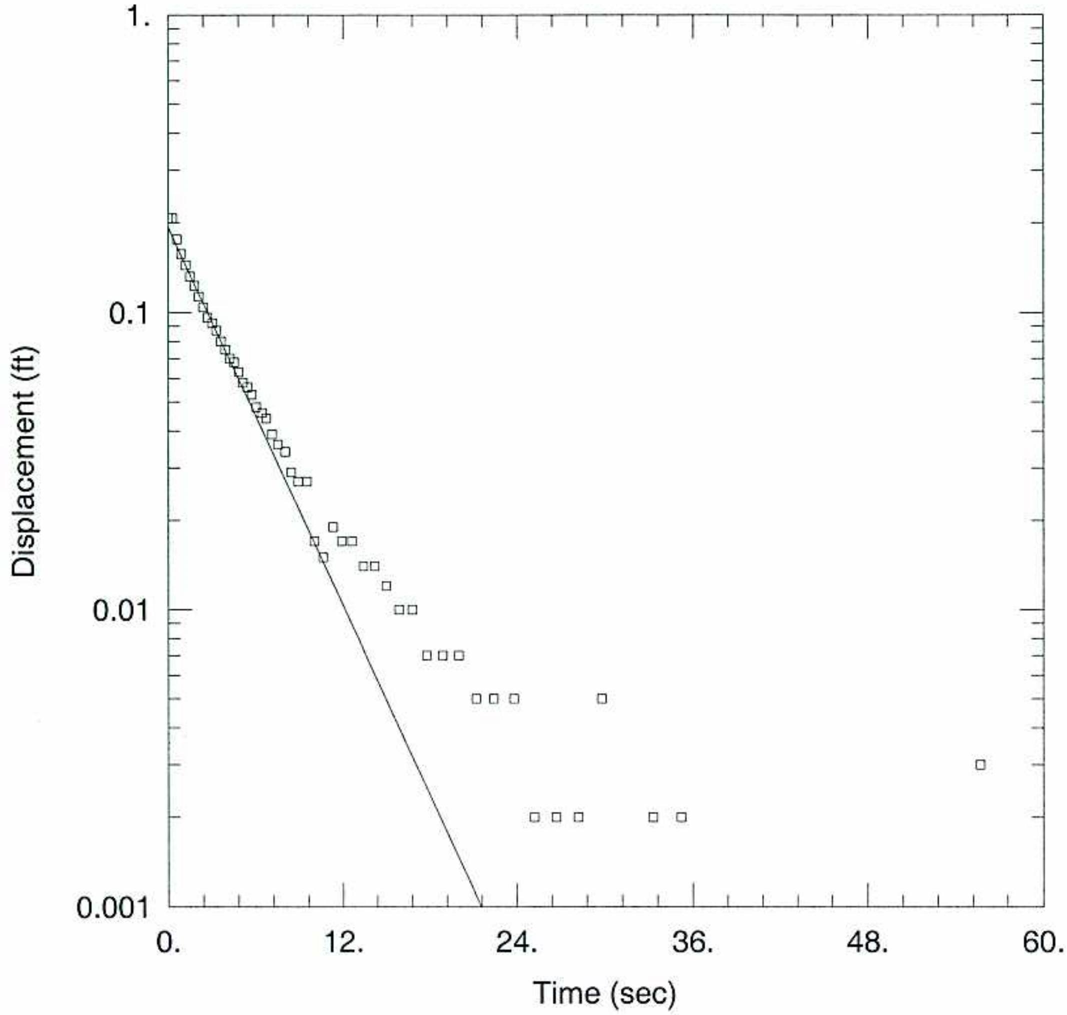
WELL DATA (MW-504S)

Initial Displacement: 0.191 ft — Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft — Well Skin Radius: 0.333 ft
Screen Length: 5. ft — Total Well Penetration Depth: 3. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined — Solution Method: Bouwer-Rice

K = 0.03661 cm/sec — y0 = 0.2013 ft



WELL TEST ANALYSIS

Data Set: \...\MW-504S rising2.aqt
Date: 10/13/05 Time: 15:46:20

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-504S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft
Anisotropy Ratio (Kz/Kr): 1.

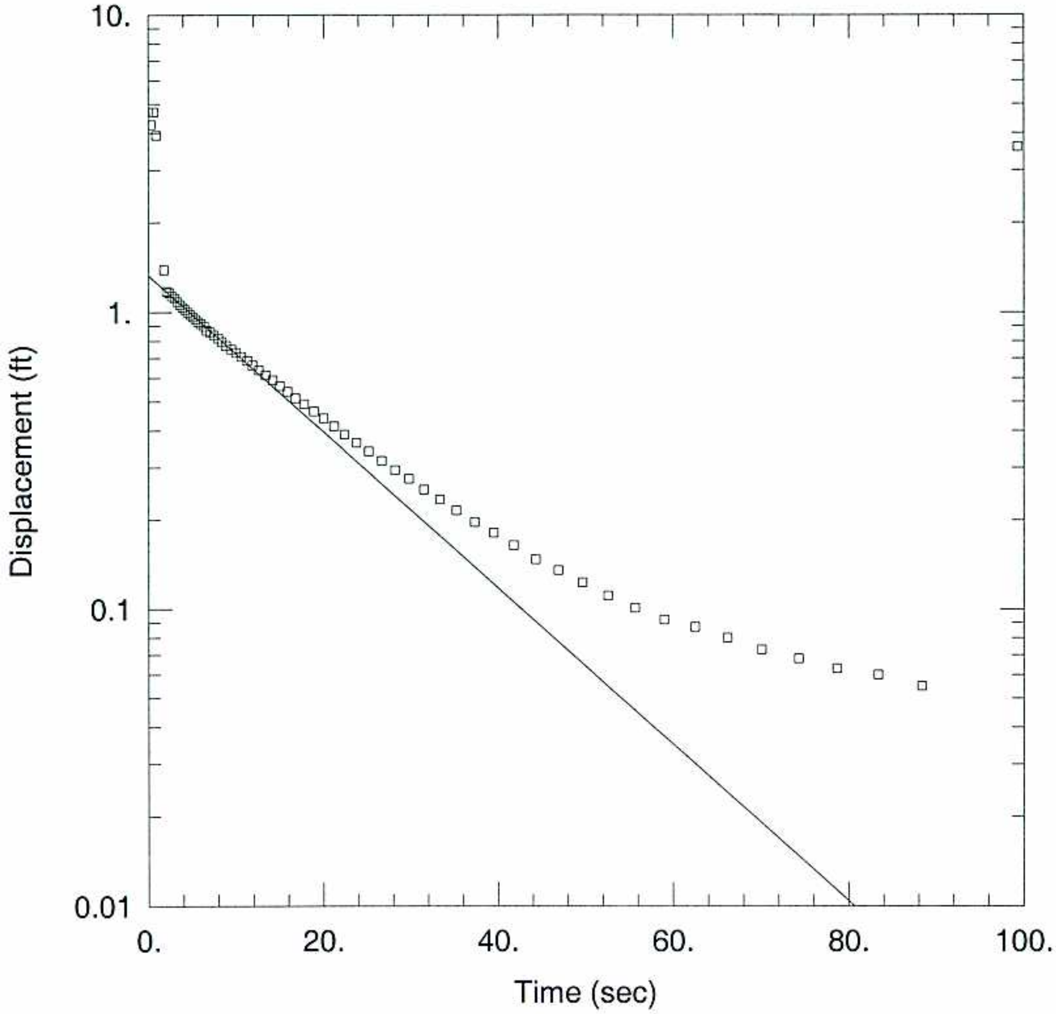
WELL DATA (MW-504S)

Initial Displacement: 0.207 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 3. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.03437 cm/sec
y0 = 0.1925 ft



WELL TEST ANALYSIS

Data Set: \...\MW-504D rising.aqt
Date: 10/13/05 Time: 15:46:13

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-504D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-504D)

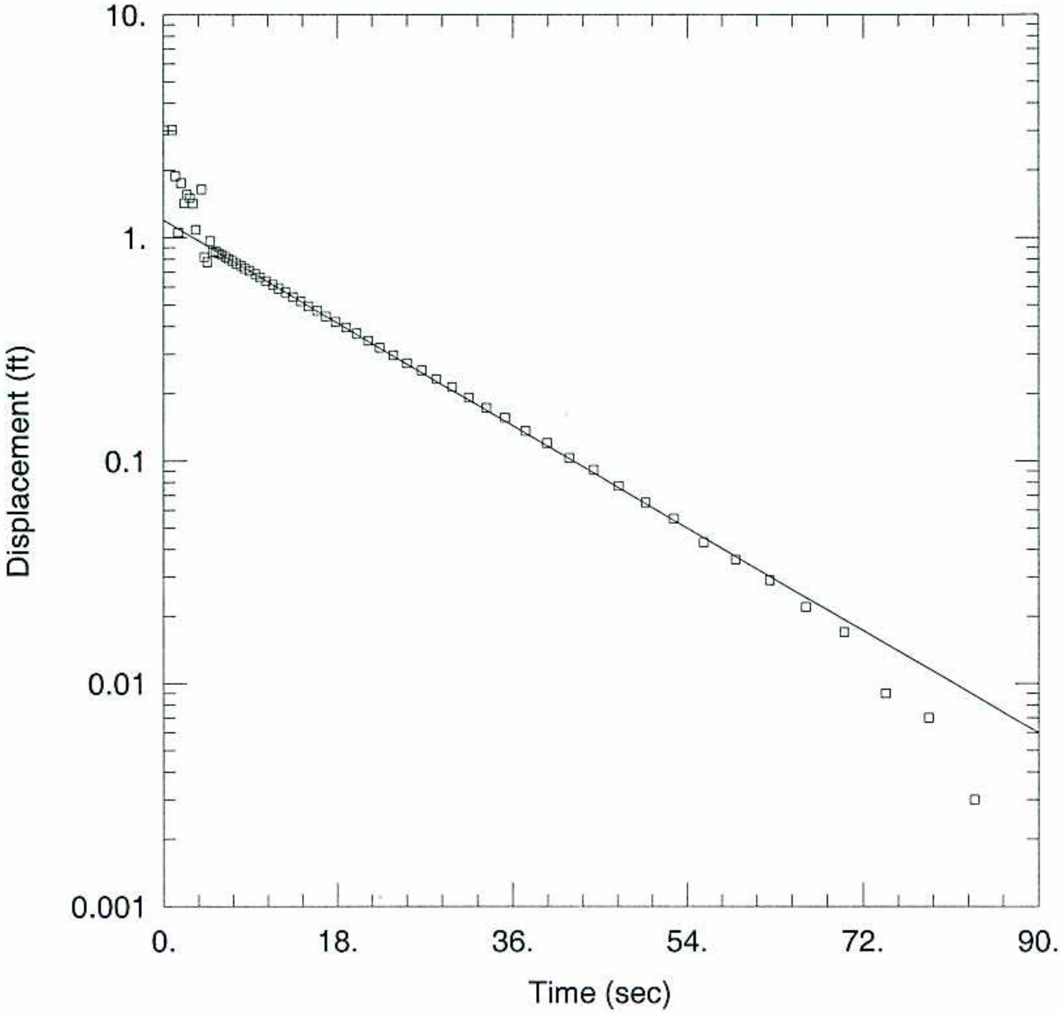
Initial Displacement: 4.707 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25

Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 26. ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.003888 cm/sec y0 = 1.328 ft



WELL TEST ANALYSIS

Data Set: \...\MW-504D Falling.aqt
Date: 10/13/05 Time: 15:46:08

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-504D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-504D)

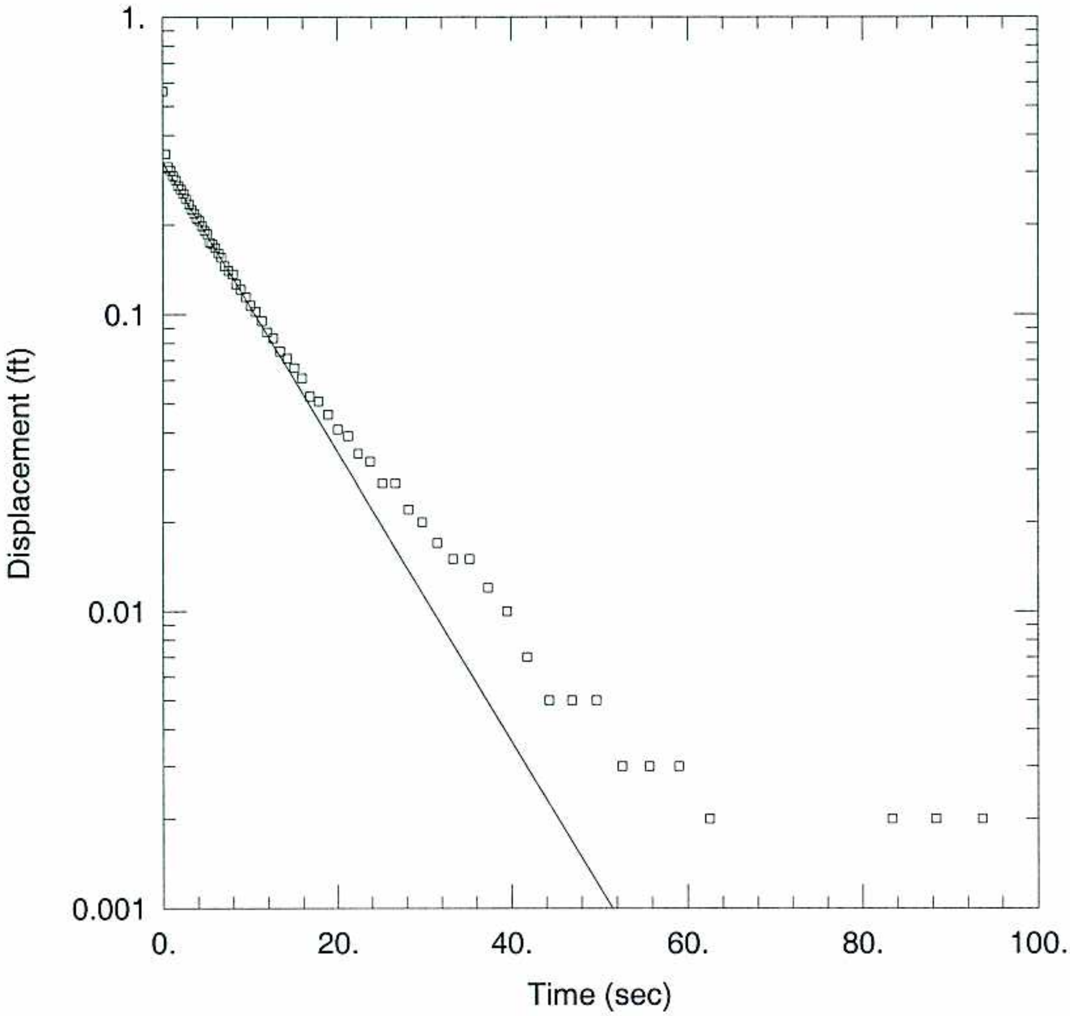
Initial Displacement: 3.03 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25

Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 26. ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.003777 cm/sec y0 = 1.196 ft



WELL TEST ANALYSIS

Data Set: \...\MW-505S rising.aqt
Date: 10/13/05 Time: 15:46:58

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-505S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

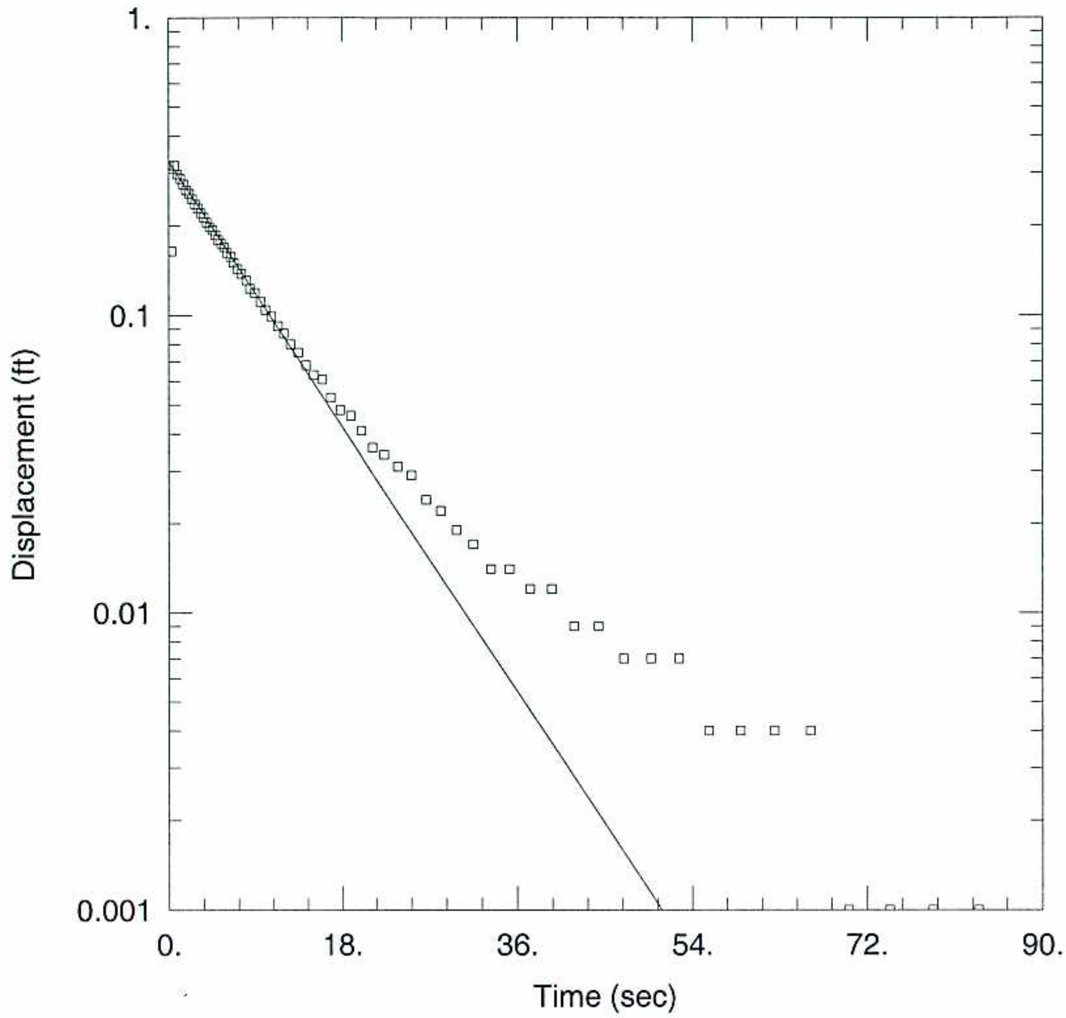
WELL DATA (MW-505S)

Initial Displacement: 0.561 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 4. ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01732 cm/sec
y0 = 0.3247 ft



WELL TEST ANALYSIS

Data Set: \...\MW-505S rising2.aqt
Date: 10/13/05 Time: 15:46:51

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-505S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

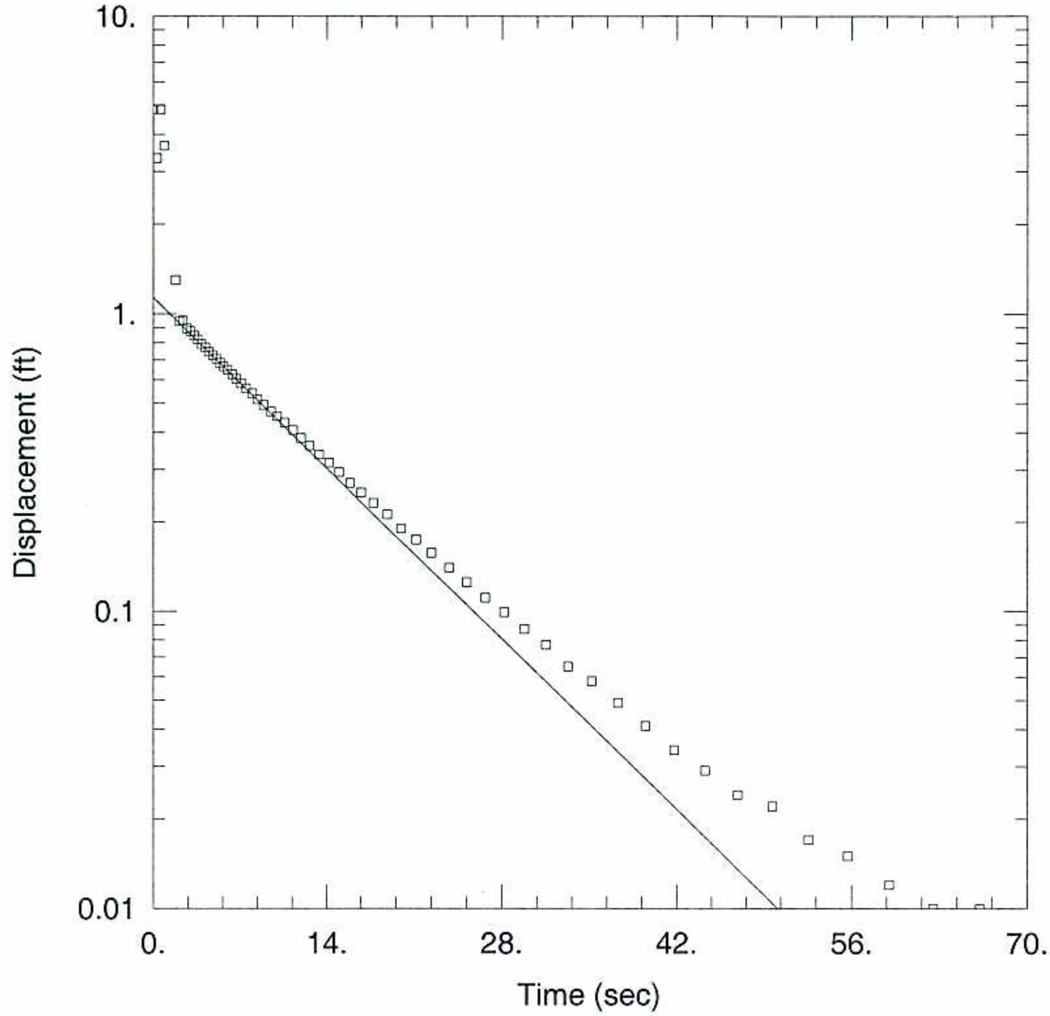
WELL DATA (MW-505S)

Initial Displacement: 0.318 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 4. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01759 cm/sec
y0 = 0.3287 ft



WELL TEST ANALYSIS

Data Set: \...\MW-505D rising.aqt
Date: 10/13/05 Time: 15:46:45

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-505D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

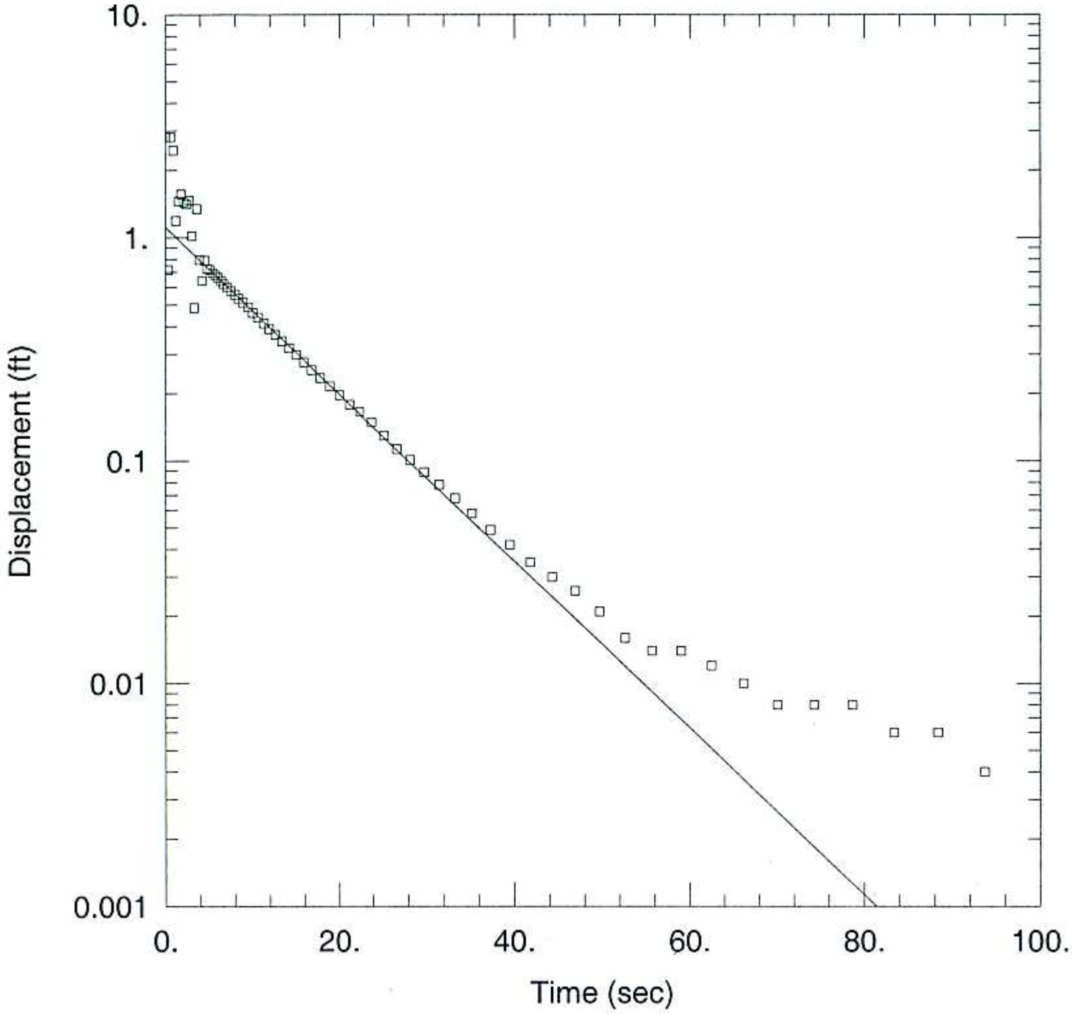
WELL DATA (MW-505D)

Initial Displacement: 4.855 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0059 cm/sec
y0 = 1.134 ft



WELL TEST ANALYSIS

Data Set: \...\MW-505D falling.aqt
Date: 10/13/05 Time: 15:46:39

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-505D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft Anisotropy Ratio (Kz/Kr): 1.

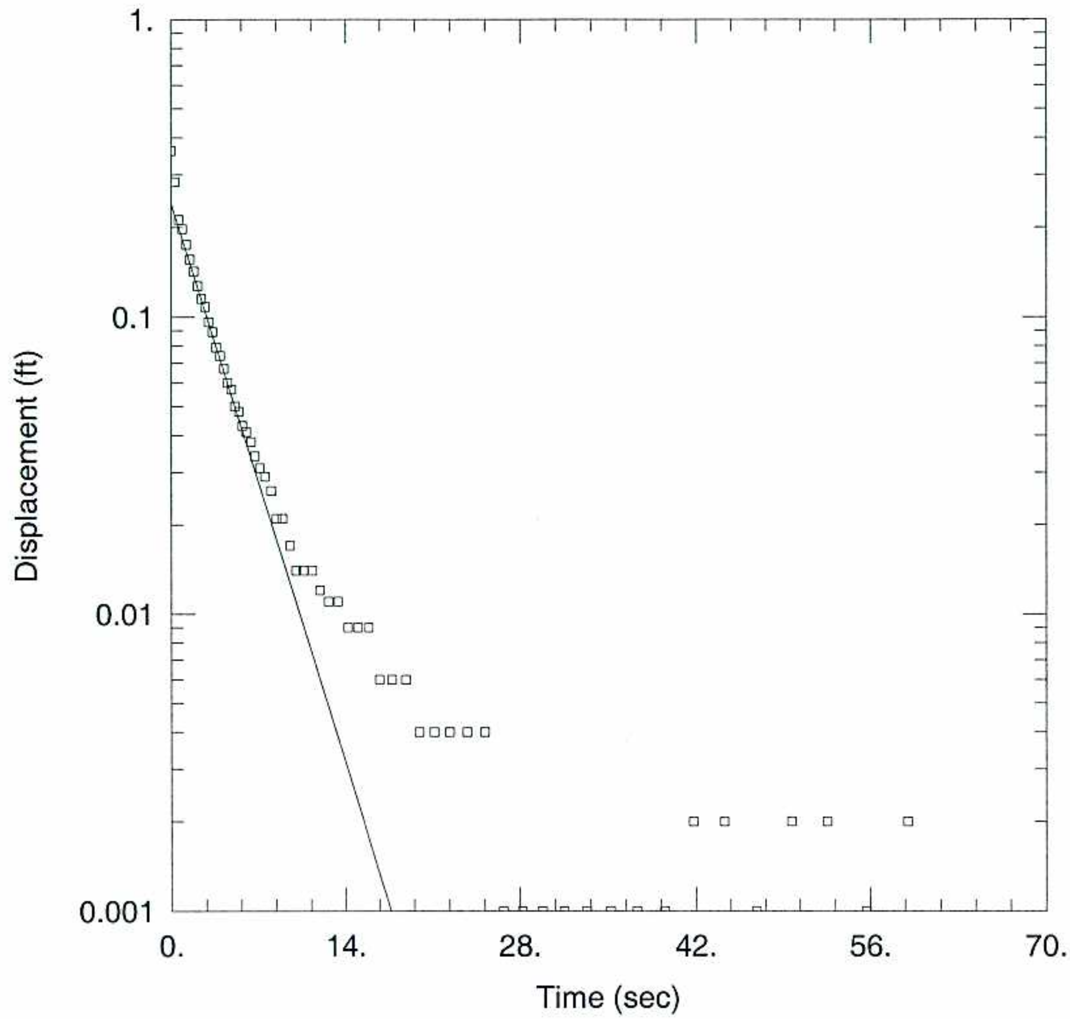
WELL DATA (MW-505D)

Initial Displacement: 2.813 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 22.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005385 cm/sec $y0$ = 1.112 ft



WELL TEST ANALYSIS

Data Set: \...\MW-506S rising.aqt
Date: 10/13/05 Time: 15:48:13

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Wuakegan, IL
Test Well: MW-506S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.8 ft Anisotropy Ratio (Kz/Kr): 1.

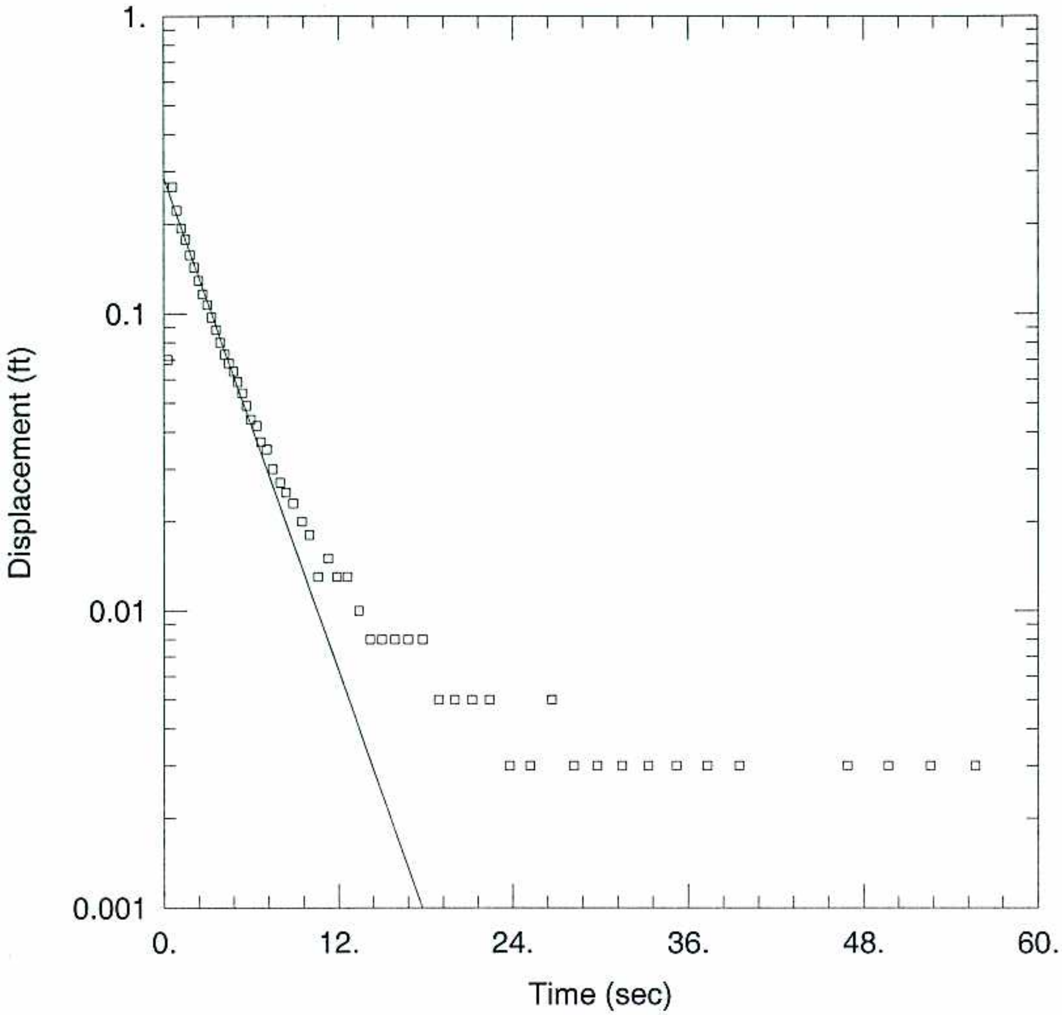
WELL DATA (MW-506S)

Initial Displacement: 0.361 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 3.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04662 cm/sec y0 = 0.2402 ft



WELL TEST ANALYSIS

Data Set: \...\MW-506S rising2.aqt
Date: 10/13/05 Time: 15:48:04

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-506S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.8 ft
Anisotropy Ratio (Kz/Kr): 1.

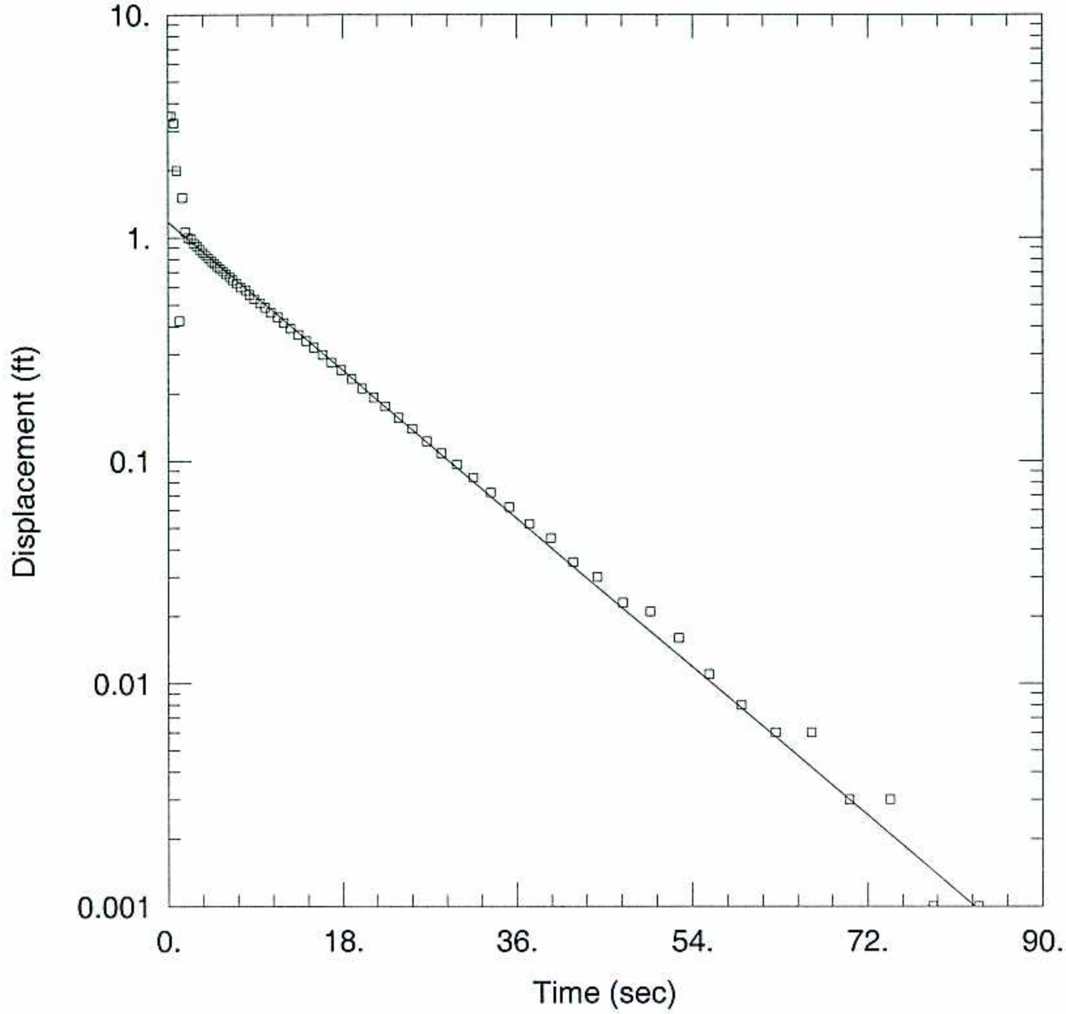
WELL DATA (MW-506S)

Initial Displacement: 0.266 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 3.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.04794 cm/sec
y0 = 0.2853 ft



WELL TEST ANALYSIS

Data Set: \...\MW-506D rising.aqt
Date: 10/13/05 Time: 15:47:14

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-506D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.8 ft
Anisotropy Ratio (Kz/Kr): 1.

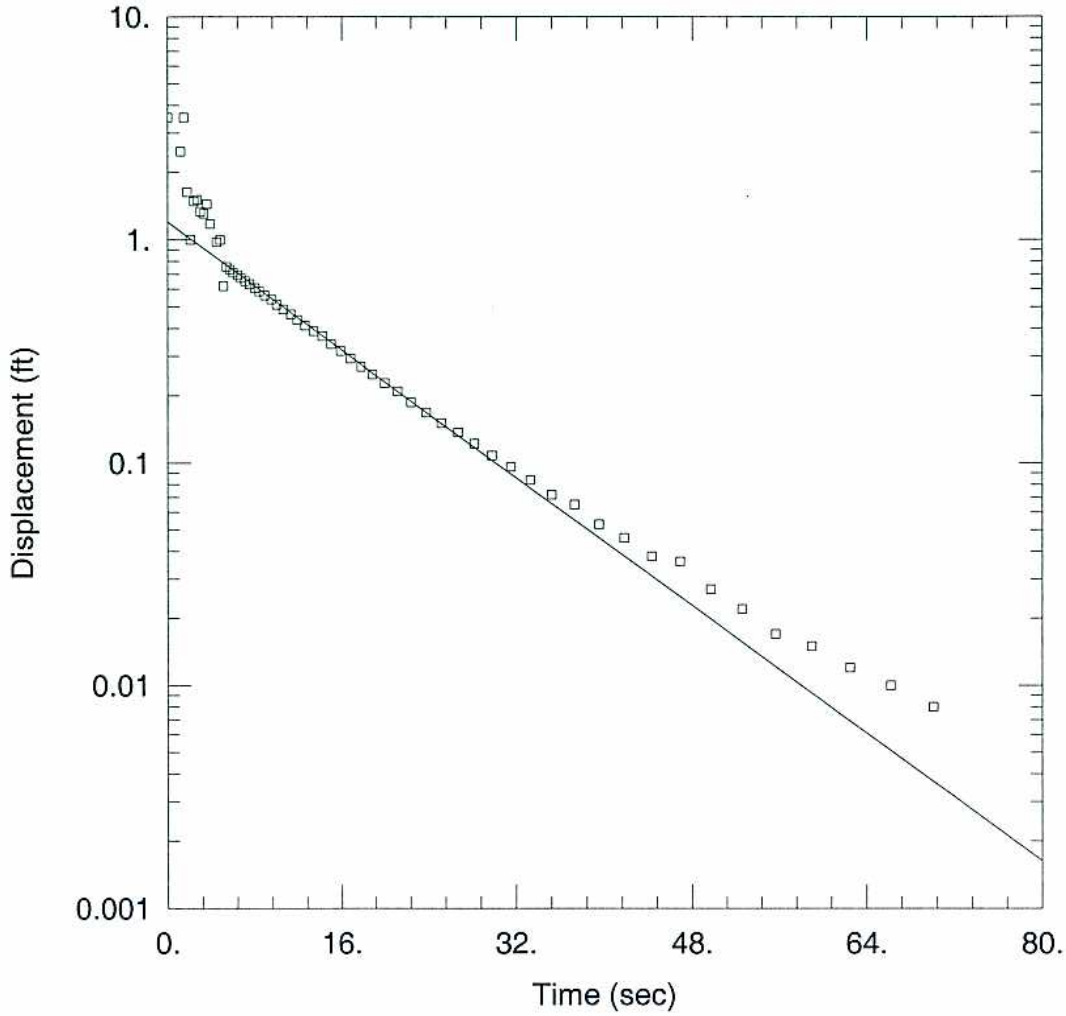
WELL DATA (MW-506D)

Initial Displacement: 3.499 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22.8 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.005347 cm/sec
y0 = 1.178 ft



WELL TEST ANALYSIS

Data Set: \...\MW-506D falling.aqt
Date: 10/13/05 Time: 15:47:06

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-506D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.8 ft
Anisotropy Ratio (Kz/Kr): 1.

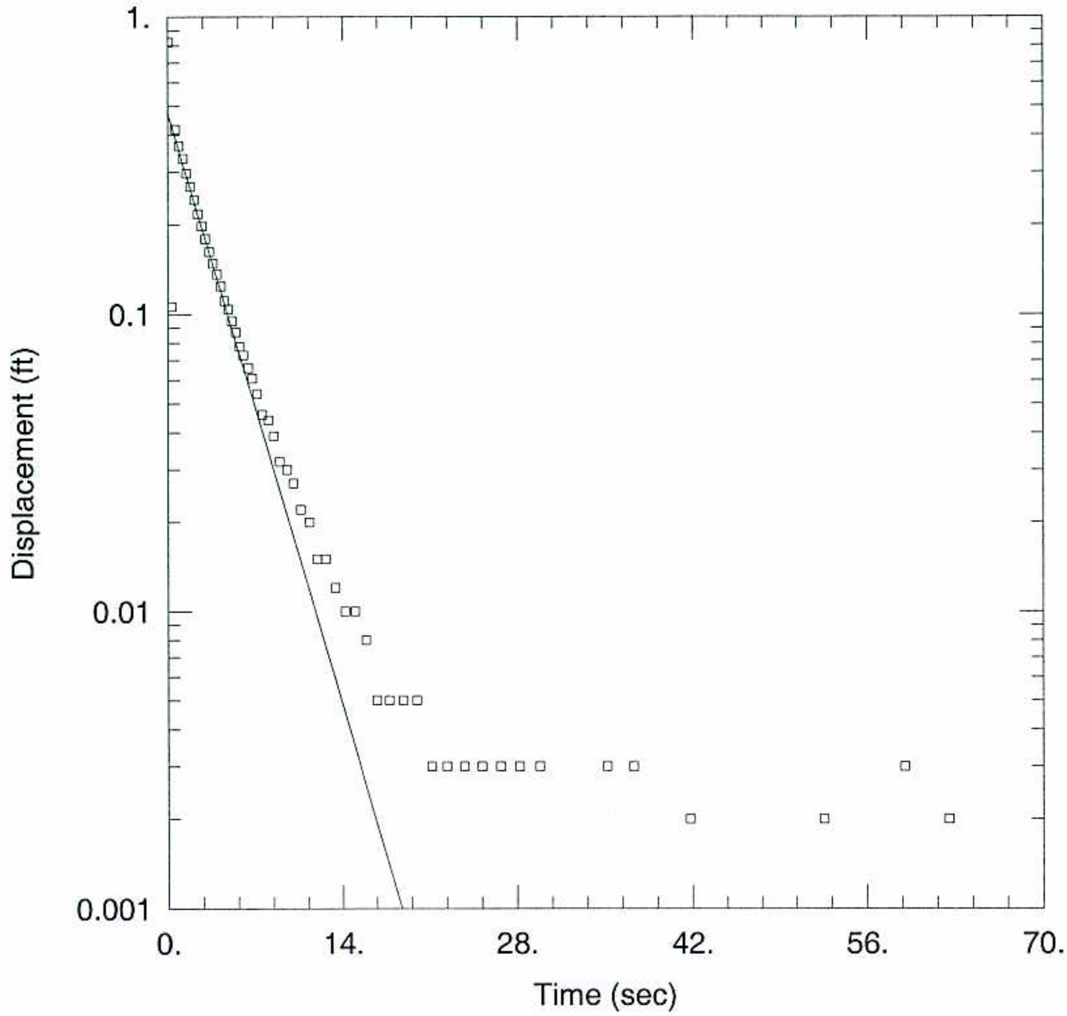
WELL DATA (MW-506D)

Initial Displacement: 3.523 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22.8 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.005179 cm/sec
y0 = 1.199 ft



WELL TEST ANALYSIS

Data Set: \...\MW-507S rising.aqt
Date: 10/13/05 Time: 15:49:32

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-507S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.7 ft Anisotropy Ratio (Kz/Kr): 1.

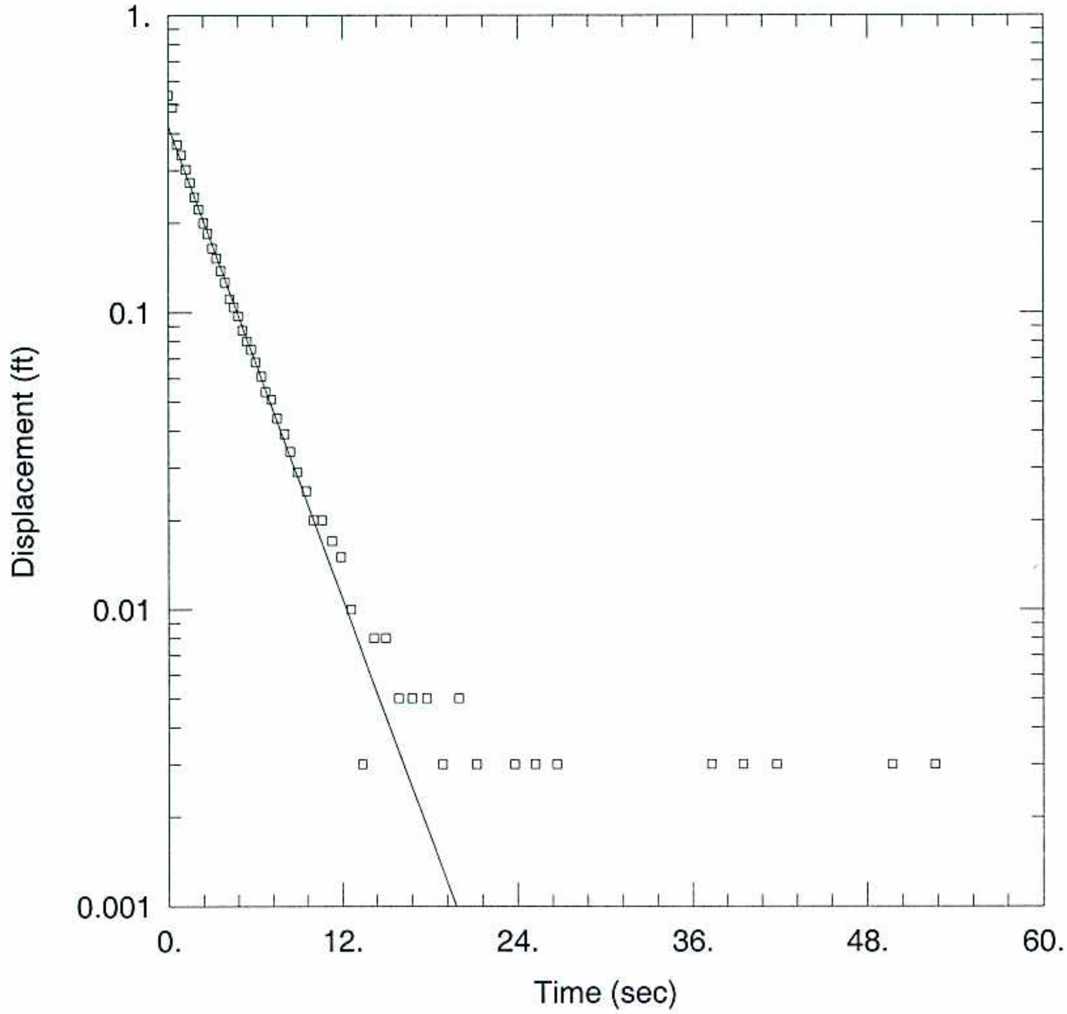
WELL DATA (MW-507S)

Initial Displacement: 0.822 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 5.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.01219 cm/sec y0 = 0.4716 ft



WELL TEST ANALYSIS

Data Set: \...\MW-507S rising2.aqt
Date: 10/13/05 Time: 15:48:45

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-507S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.7 ft
Anisotropy Ratio (Kz/Kr): 1.

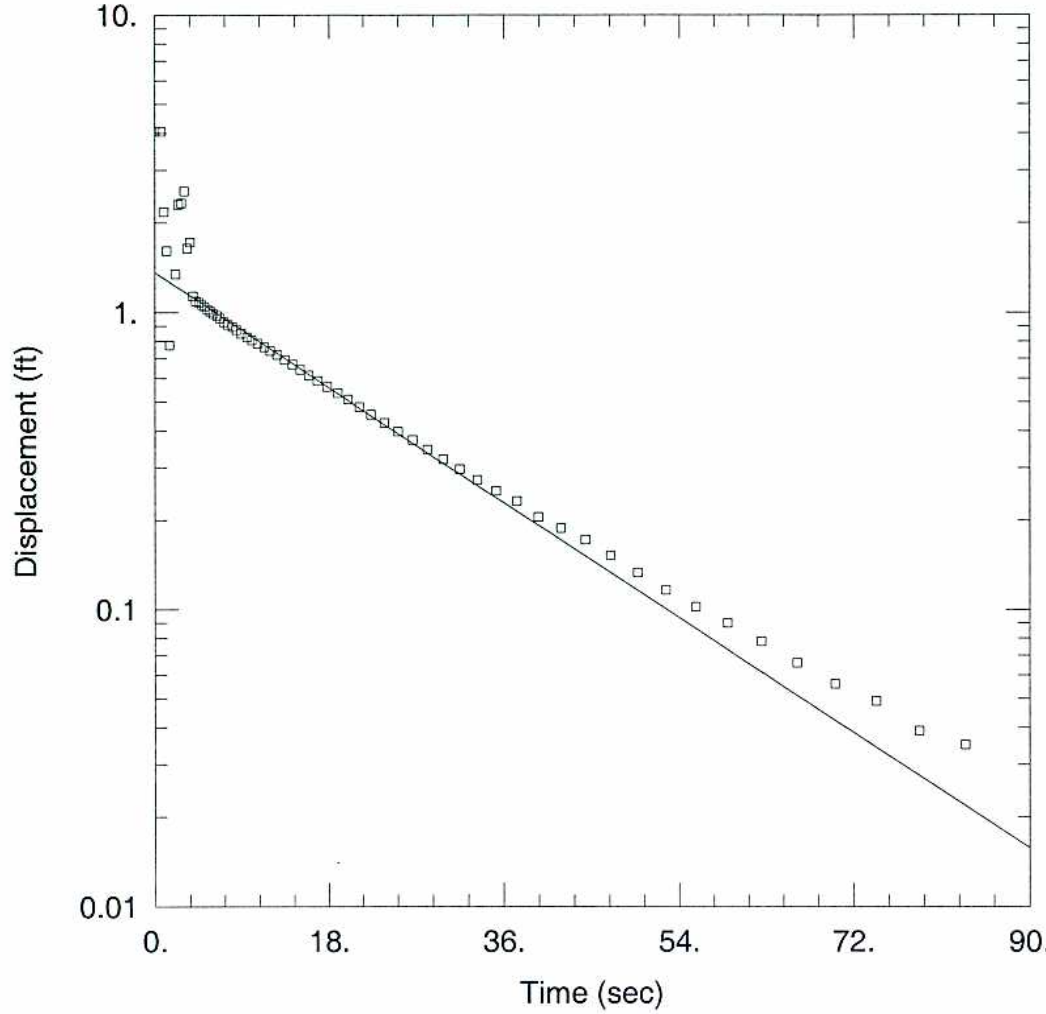
WELL DATA (MW-507S)

Initial Displacement: 0.538 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 5.5 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01136 cm/sec
y0 = 0.4231 ft



WELL TEST ANALYSIS

Data Set: \...\MW-507D rising.aqt
Date: 10/13/05 Time: 15:48:37

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-507D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.7 ft Anisotropy Ratio (Kz/Kr): 1.

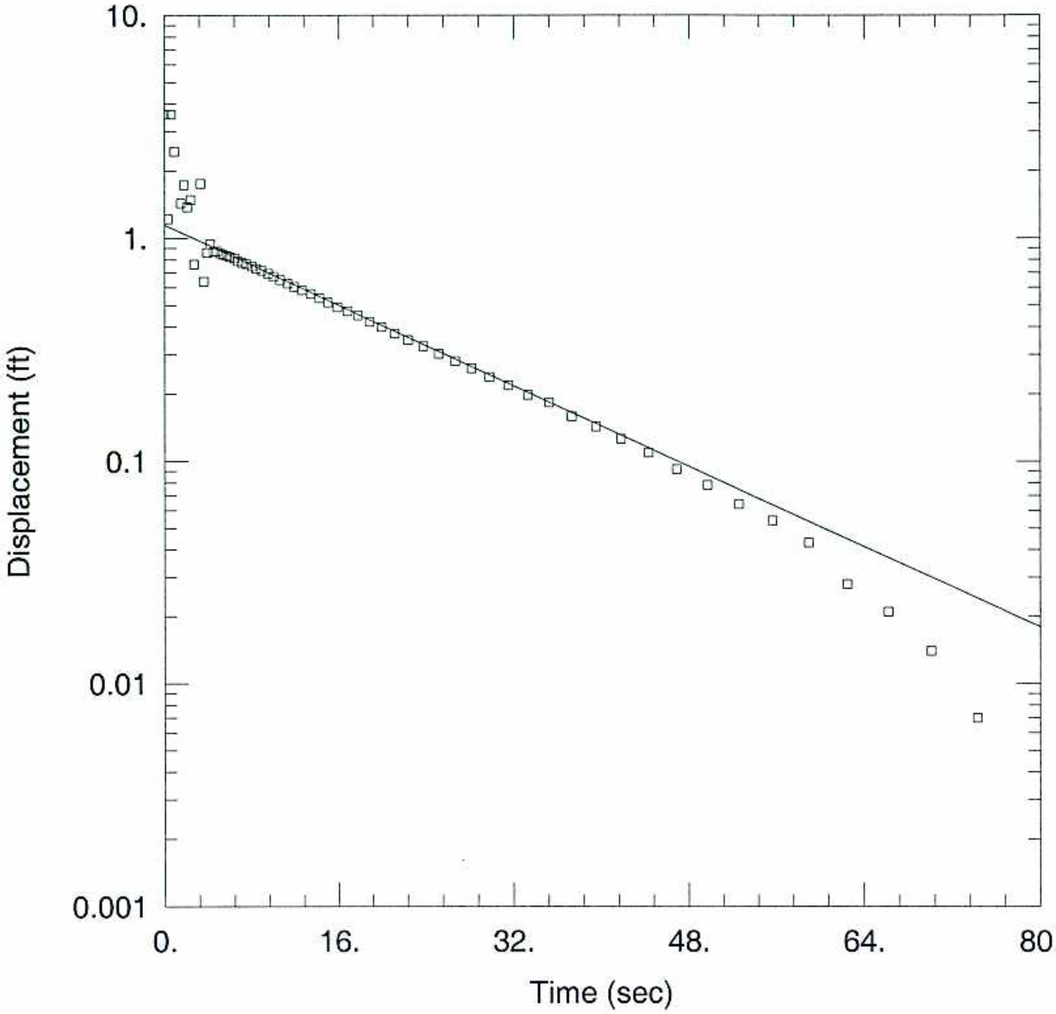
WELL DATA (MW-507D)

Initial Displacement: 4.05 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 23.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.003131 cm/sec y0 = 1.361 ft



WELL TEST ANALYSIS

Data Set: \...\MW-507D Falling.aqt
Date: 10/13/05 Time: 15:48:29

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-507D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.7 ft
Anisotropy Ratio (Kz/Kr): 1.

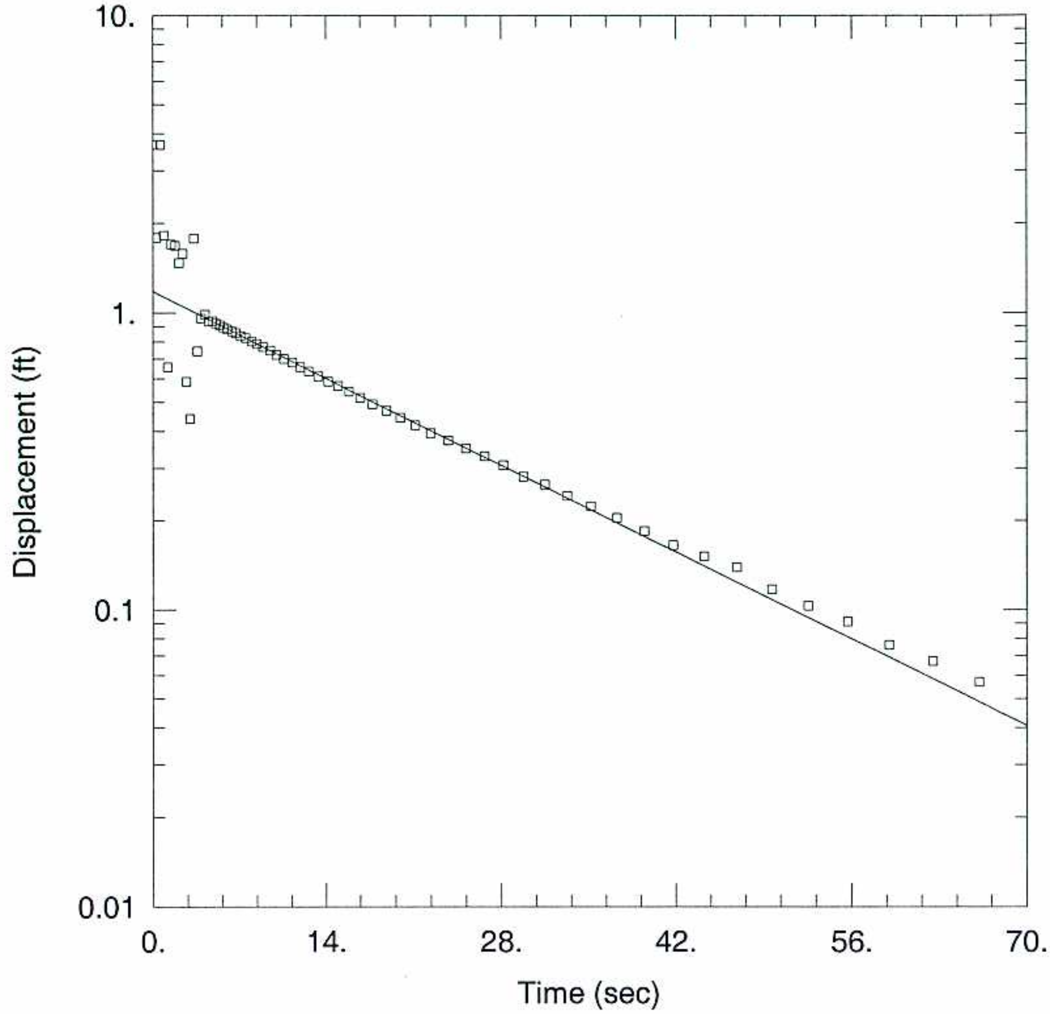
WELL DATA (MW-507D)

Initial Displacement: 3.587 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 23.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003281 cm/sec
y0 = 1.146 ft



WELL TEST ANALYSIS

Data Set: \...\MW-507D Falling2.aqt
Date: 10/13/05 Time: 15:48:21

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-507D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 23.7 ft
Anisotropy Ratio (Kz/Kr): 1.

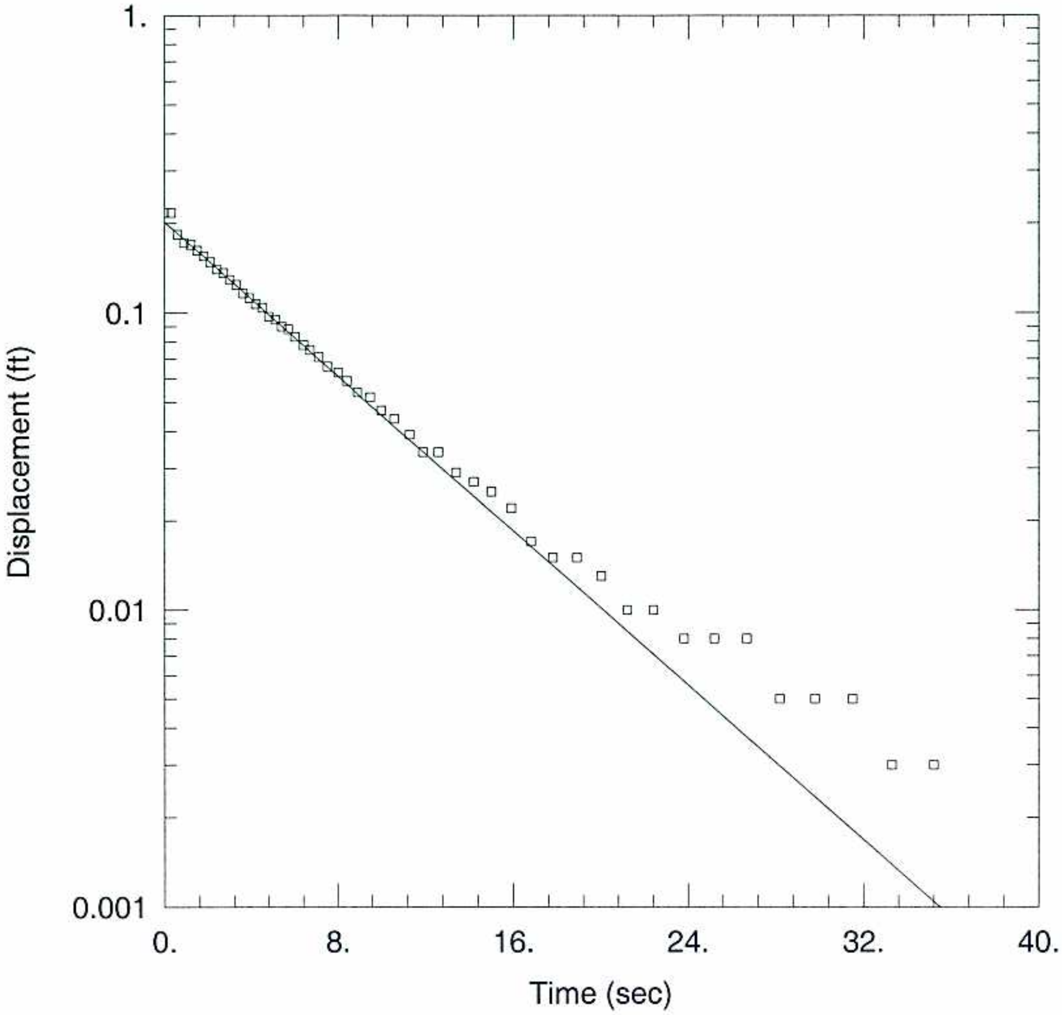
WELL DATA (MW-507D)

Initial Displacement: 3.66 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 23.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003038 cm/sec
y0 = 1.178 ft



WELL TEST ANALYSIS

Data Set: \...\MW-508S rising.aqt
Date: 10/13/05 Time: 15:49:58

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-508S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft Anisotropy Ratio (Kz/Kr): 1.

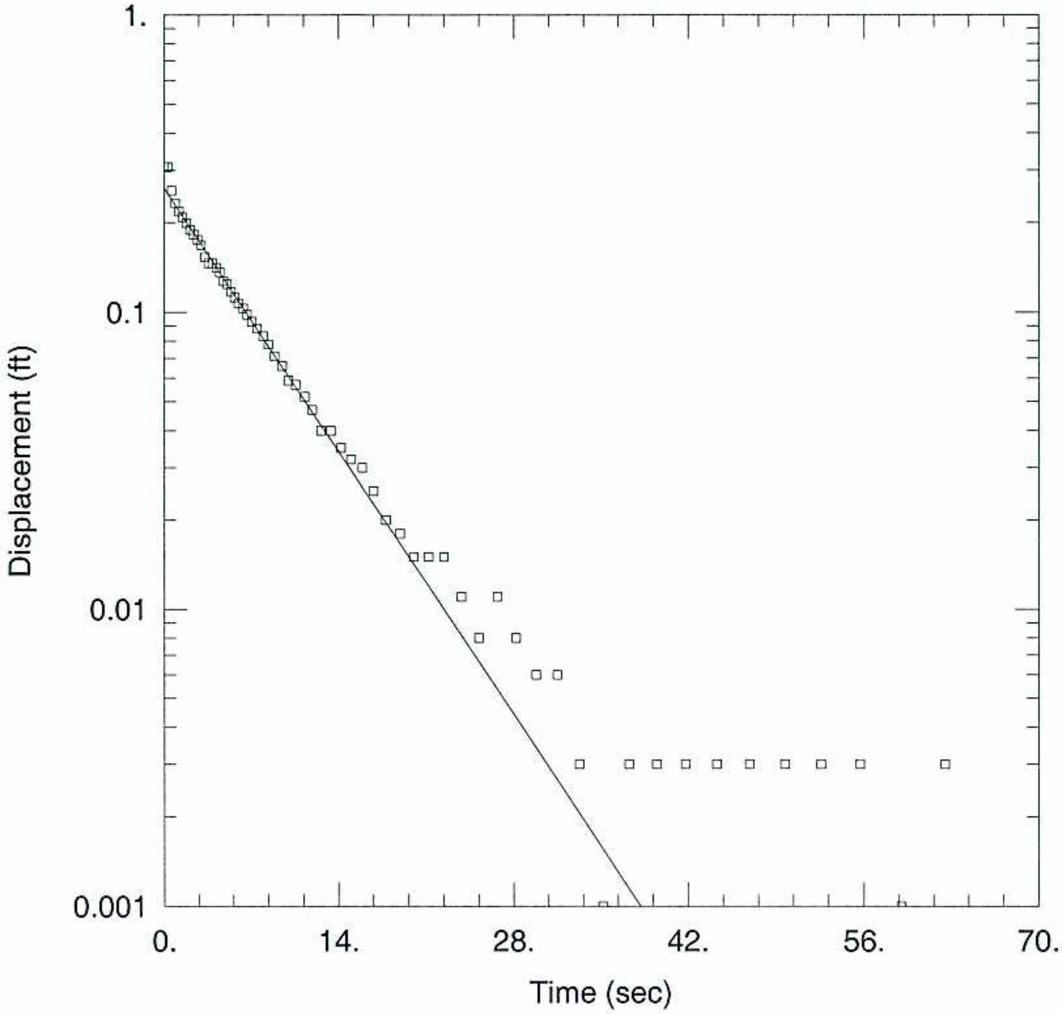
WELL DATA (MW-508S)

Initial Displacement: 0.217 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 3.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.0221 cm/sec y0 = 0.2021 ft



WELL TEST ANALYSIS

Data Set: \...\MW-508S rising2.aqt
Date: 10/13/05 Time: 15:49:52

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-508S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft
Anisotropy Ratio (Kz/Kr): 1.

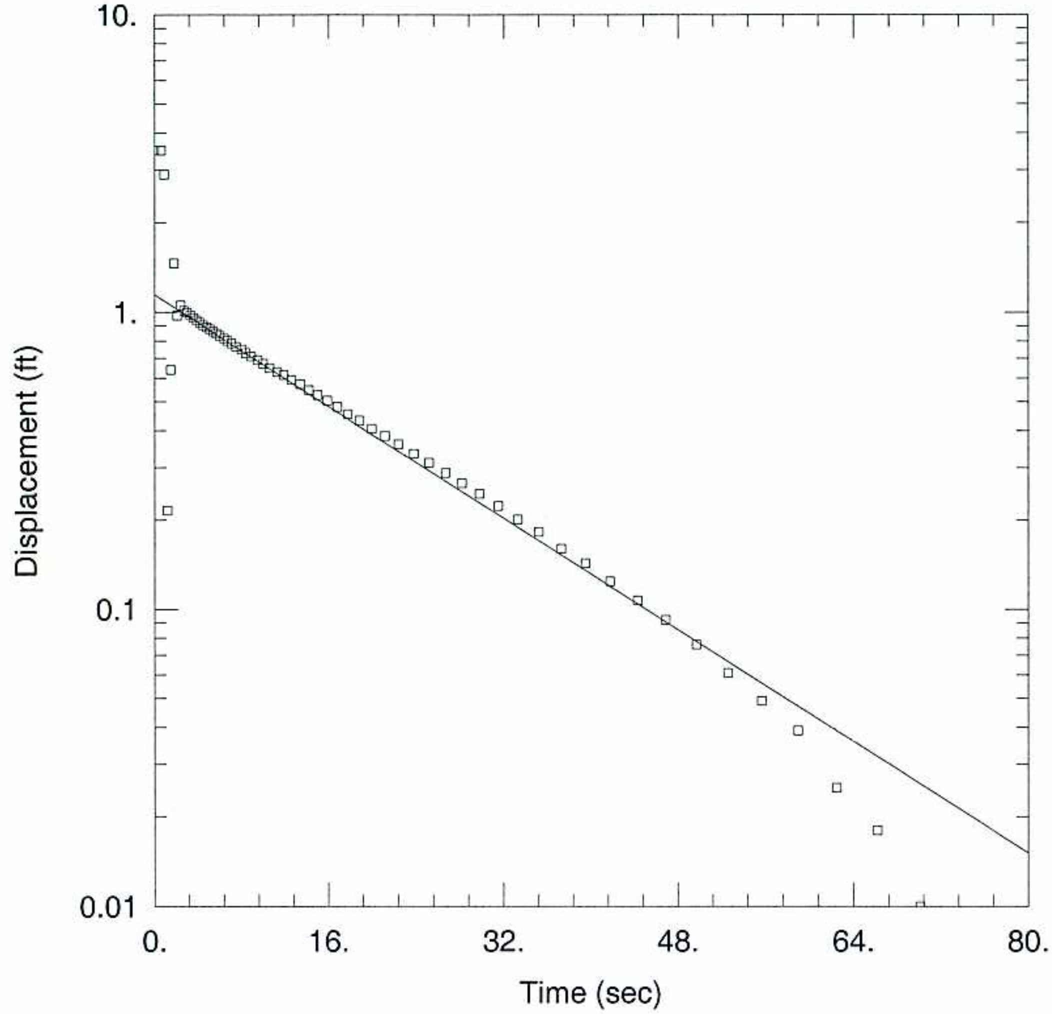
WELL DATA (MW-508S)

Initial Displacement: 0.307 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 3.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0215 cm/sec
y0 = 0.2609 ft



WELL TEST ANALYSIS

Data Set: \...\MW-508D rising.aqt
Date: 10/13/05 Time: 15:49:45

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-508D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft
Anisotropy Ratio (Kz/Kr): 1.

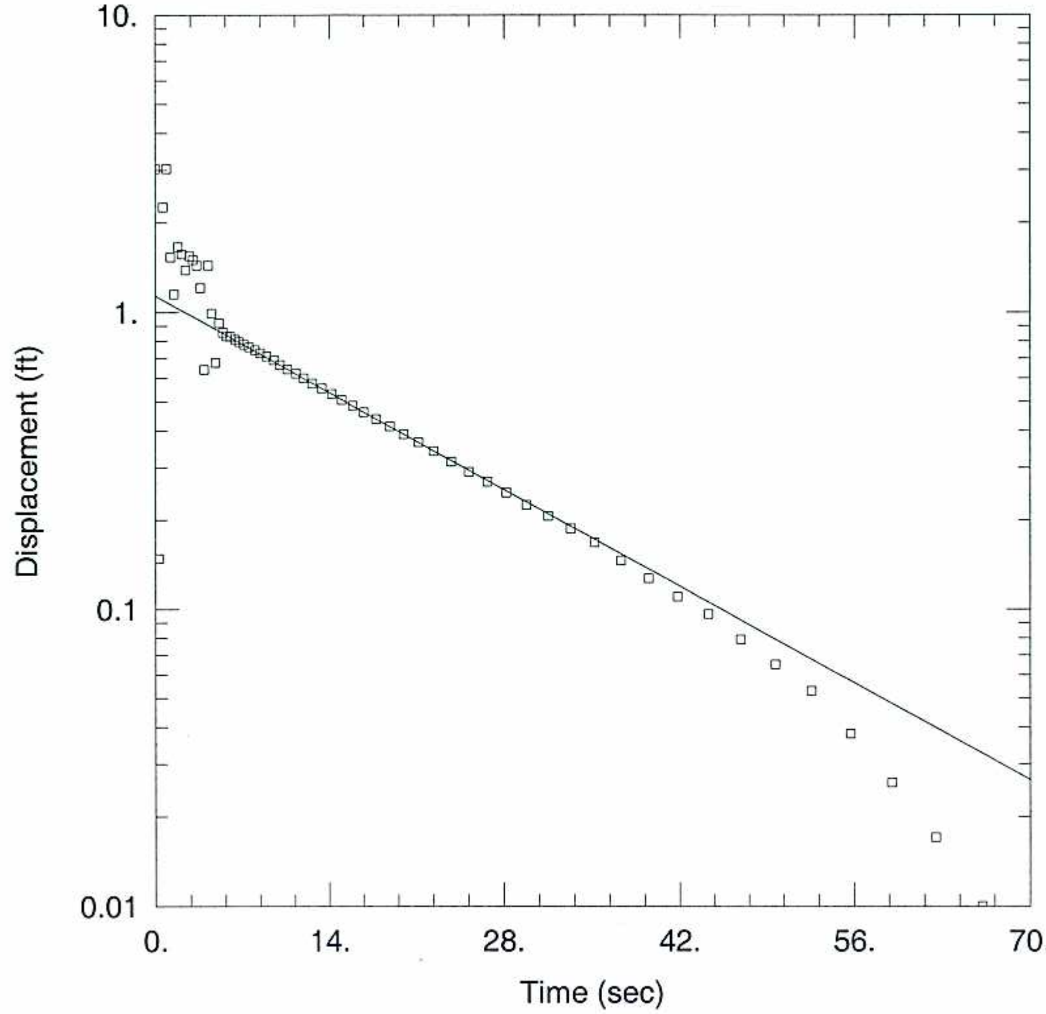
WELL DATA (MW-508D)

Initial Displacement: 3.488 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 26. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003472 cm/sec
y0 = 1.145 ft



WELL TEST ANALYSIS

Data Set: \...\MW-508D Falling.aqt
Date: 10/13/05 Time: 15:49:39

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-508D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 26. ft Anisotropy Ratio (Kz/Kr): 1.

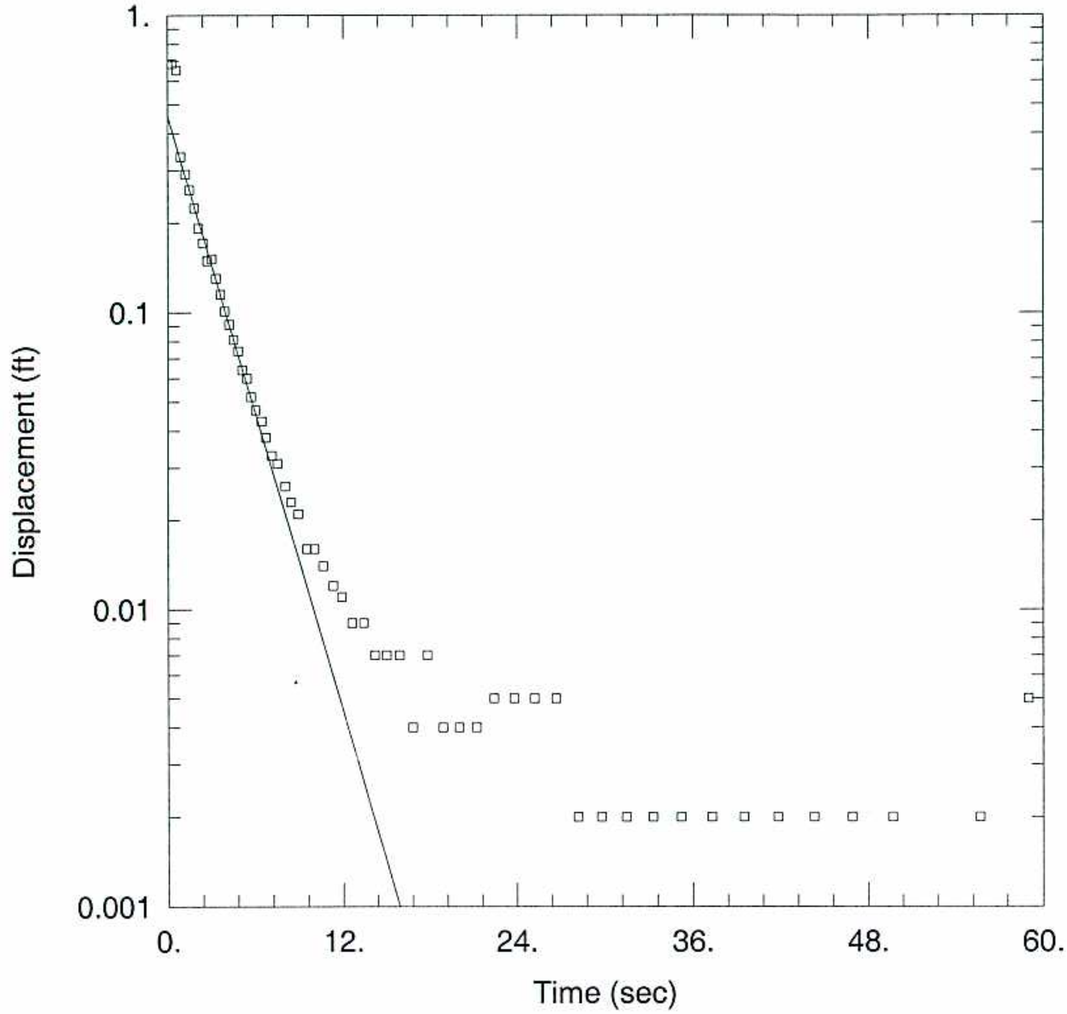
WELL DATA (MW-508D)

Initial Displacement: 3.034 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 26. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.00344 cm/sec y0 = 1.135 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509S rising.aqt
Date: 10/13/05 Time: 15:50:48

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509S
Test Date: 05-09-2005

AQUIFER DATA

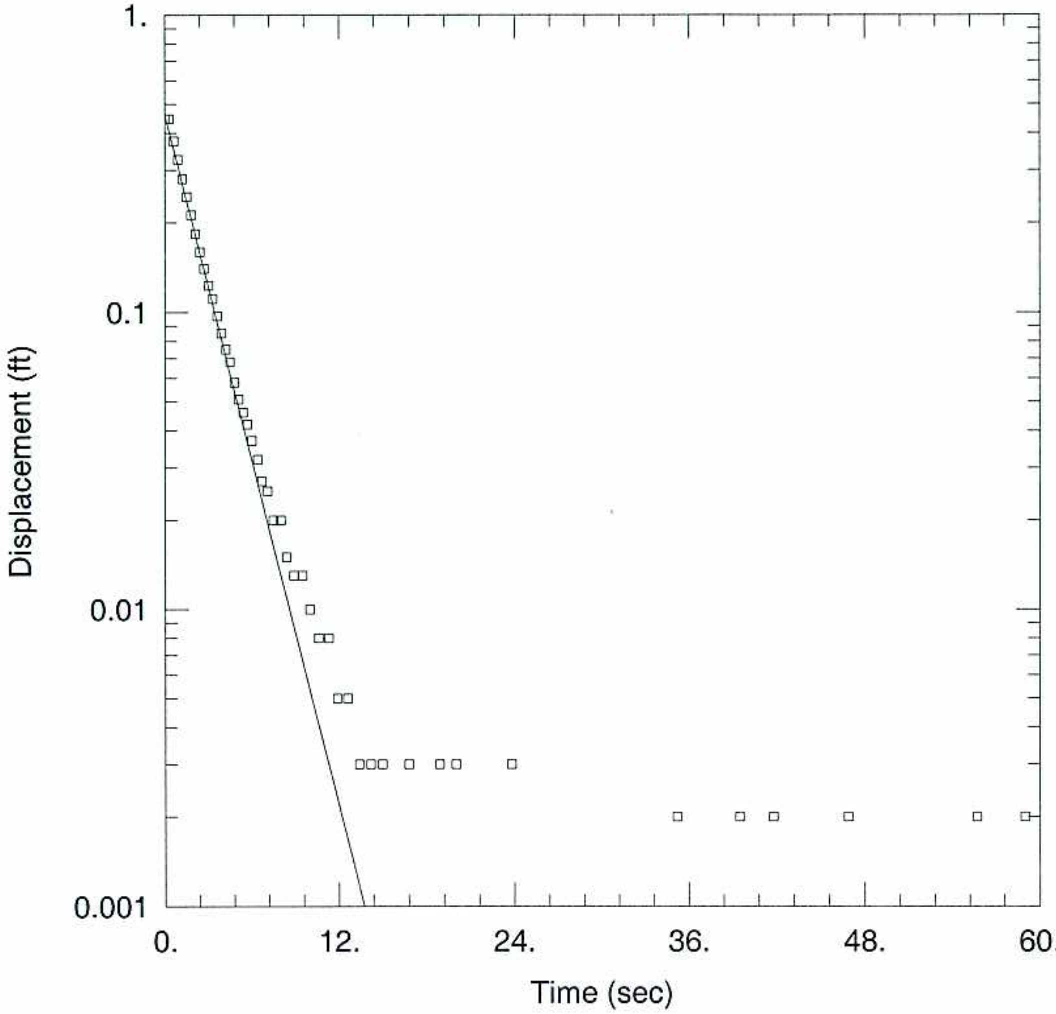
Saturated Thickness: 19.1 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-509S)

Initial Displacement: 0.685 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 6.6 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.0151 cm/sec y0 = 0.4568 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509S rising2.aqt
Date: 10/13/05 Time: 15:50:42

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19.1 ft
Anisotropy Ratio (Kz/Kr): 1.

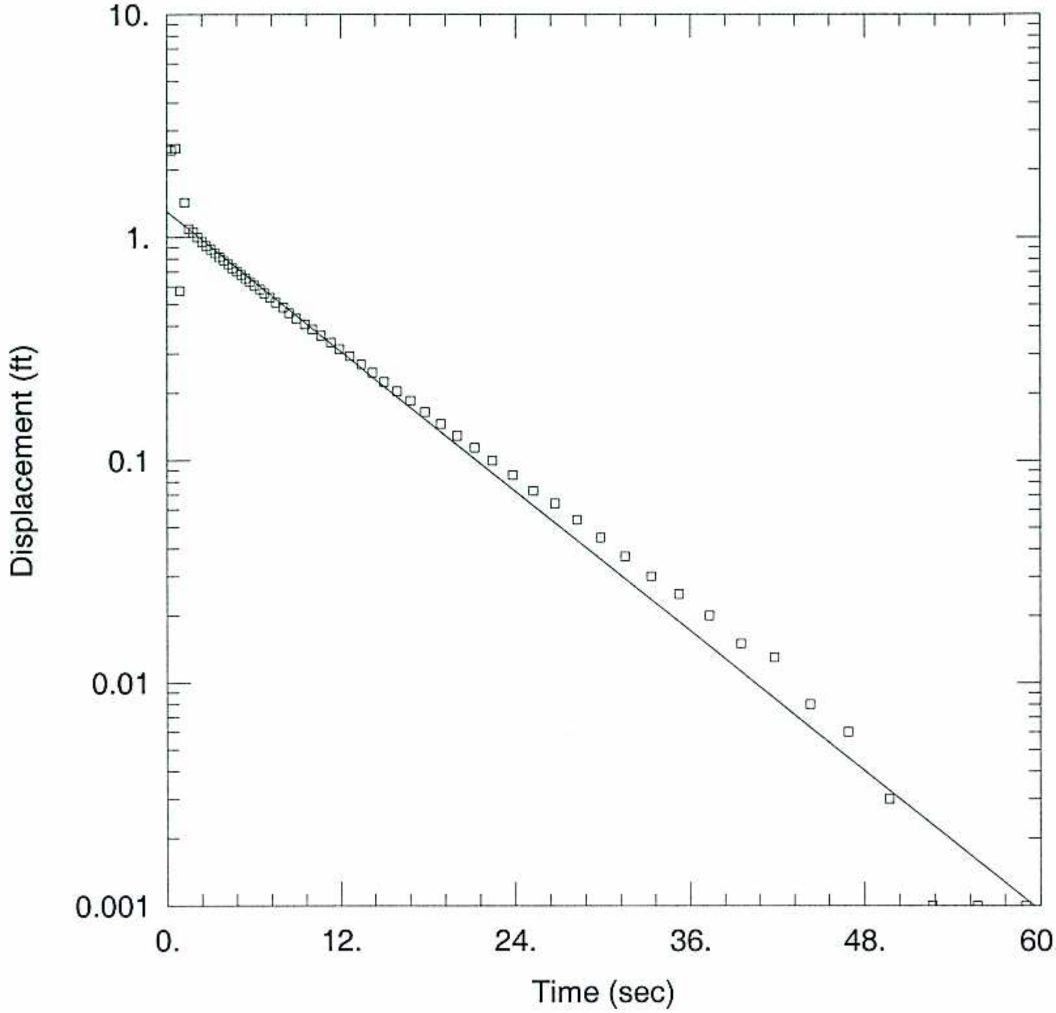
WELL DATA (MW-509S)

Initial Displacement: 0.446 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 6.6 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01751 cm/sec
y0 = 0.4615 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509D Rising.aqt
Date: 10/13/05 Time: 15:50:35

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19.1 ft Anisotropy Ratio (Kz/Kr): 1.

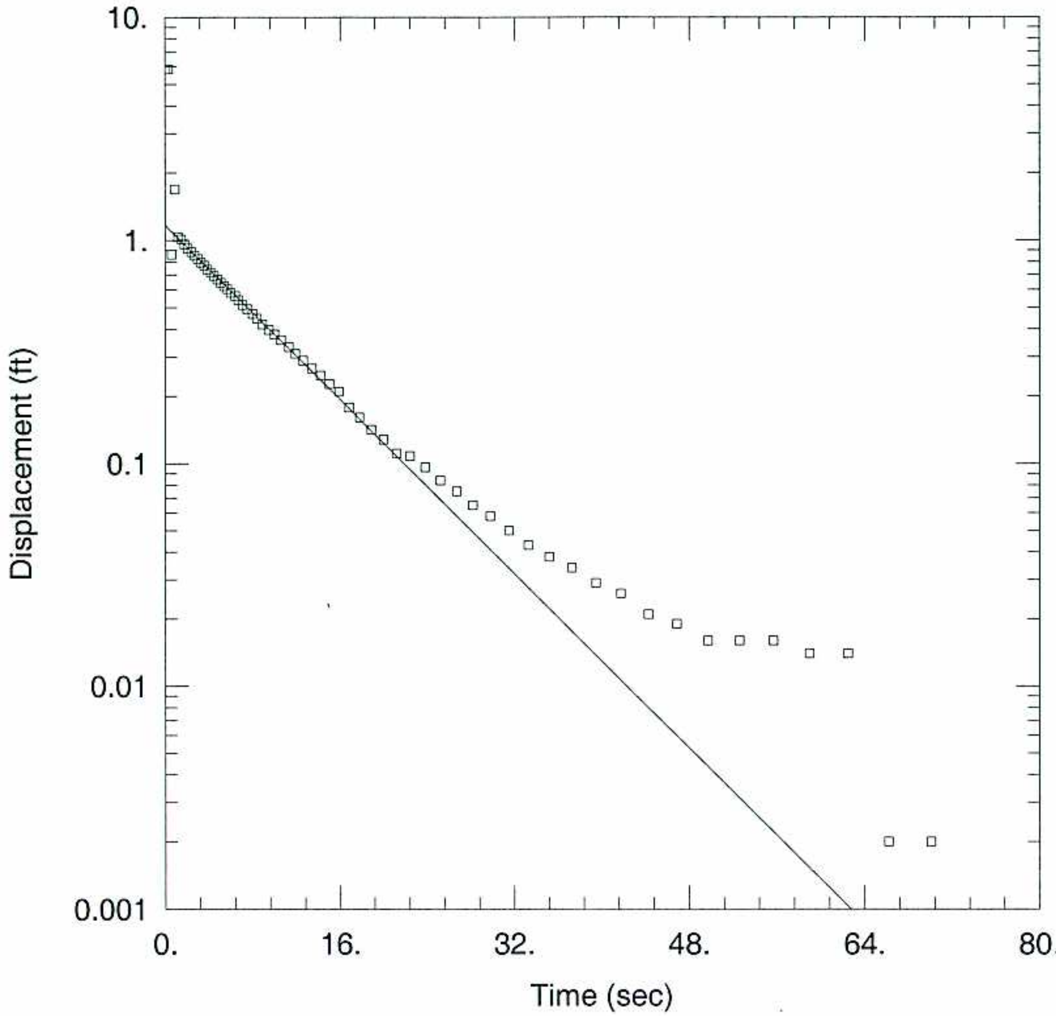
WELL DATA (MW-509D)

Initial Displacement: 2.495 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 19.1 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.007326 cm/sec y0 = 1.302 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509D Rising2.aqt
Date: 10/13/05 Time: 15:50:28

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19.1 ft Anisotropy Ratio (Kz/Kr): 1.

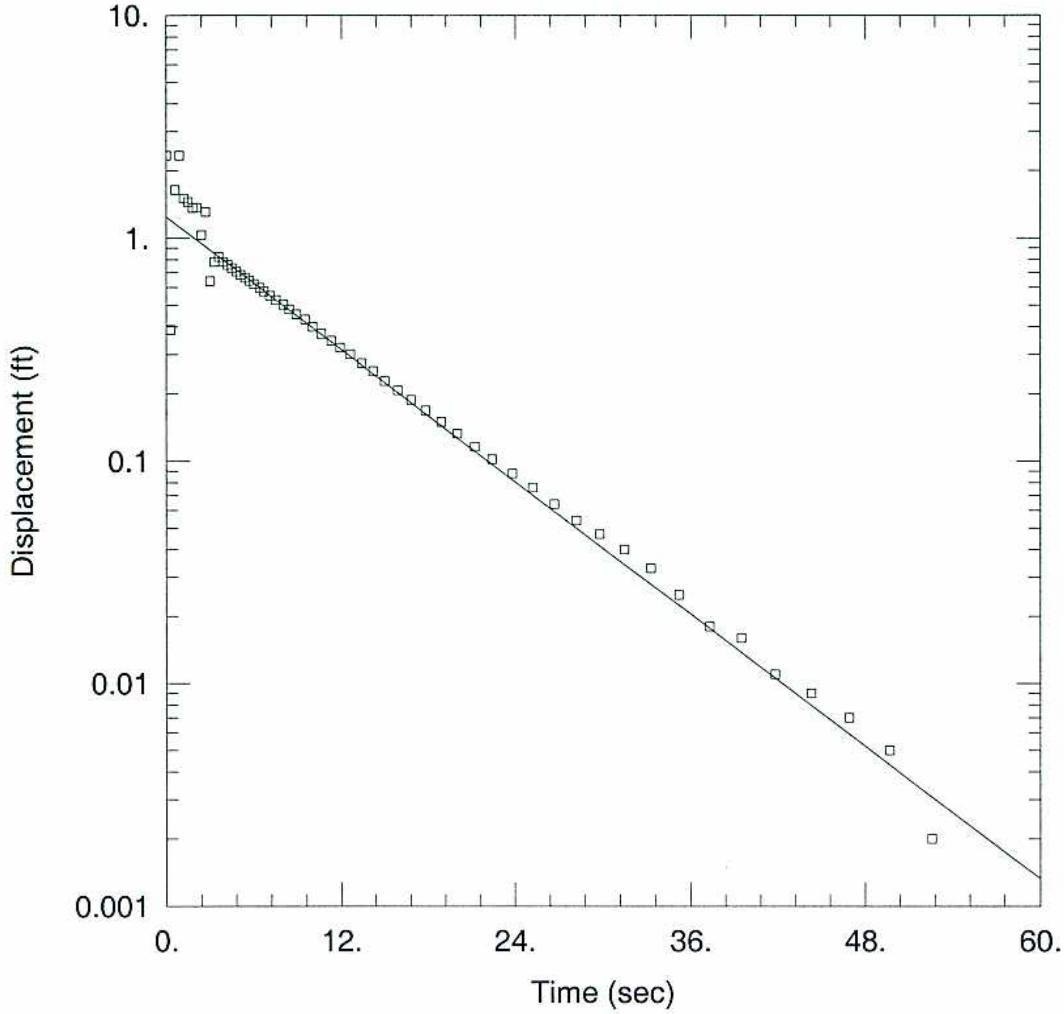
WELL DATA (MW-509D)

Initial Displacement: 5.835 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 19.1 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.006849 cm/sec y0 = 1.169 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509D Falling.aqt
Date: 10/13/05 Time: 15:50:21

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19.1 ft
Anisotropy Ratio (Kz/Kr): 1.

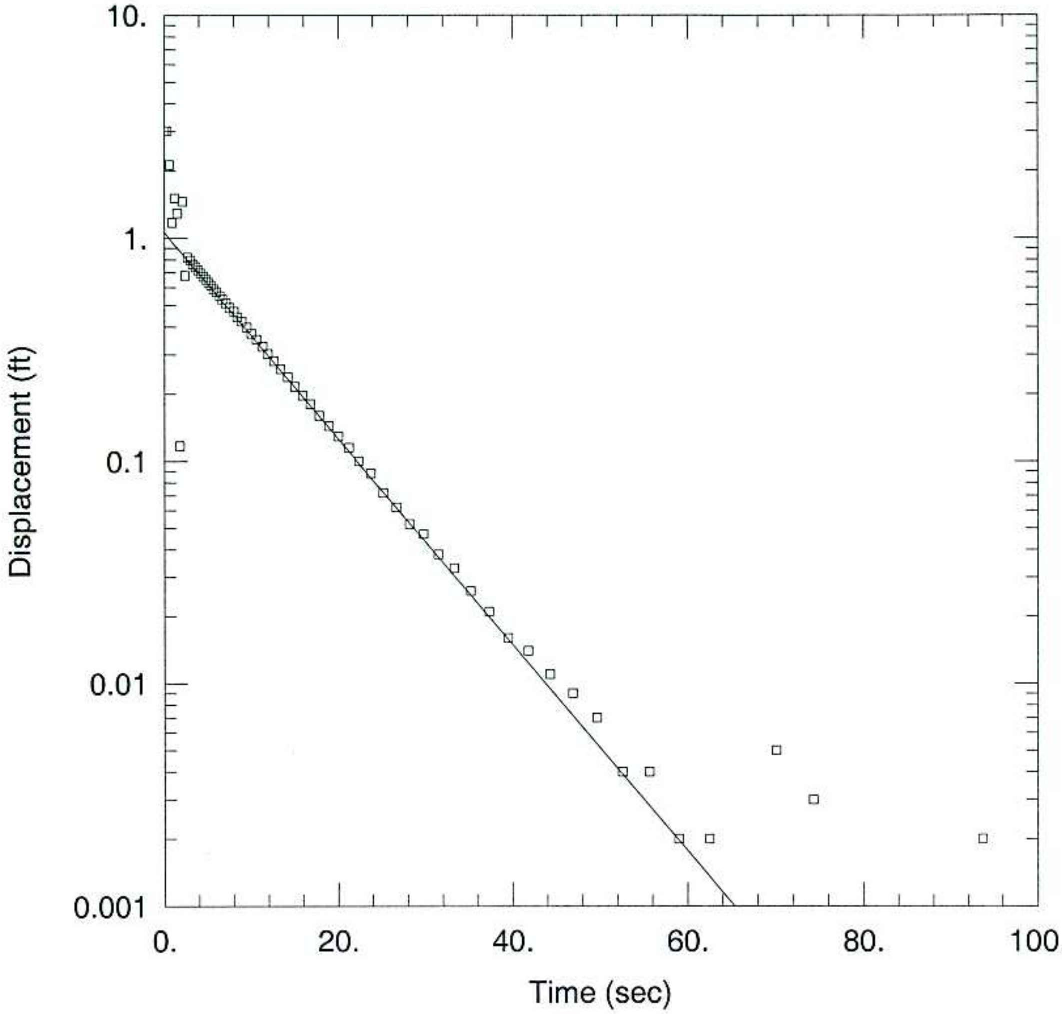
WELL DATA (MW-509D)

Initial Displacement: 2.339 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 19.1 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.006939 cm/sec
y0 = 1.242 ft



WELL TEST ANALYSIS

Data Set: \...\MW-509D Falling2.aqt
Date: 10/13/05 Time: 15:50:09

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-509D
Test Date: 05-09-2005

AQUIFER DATA

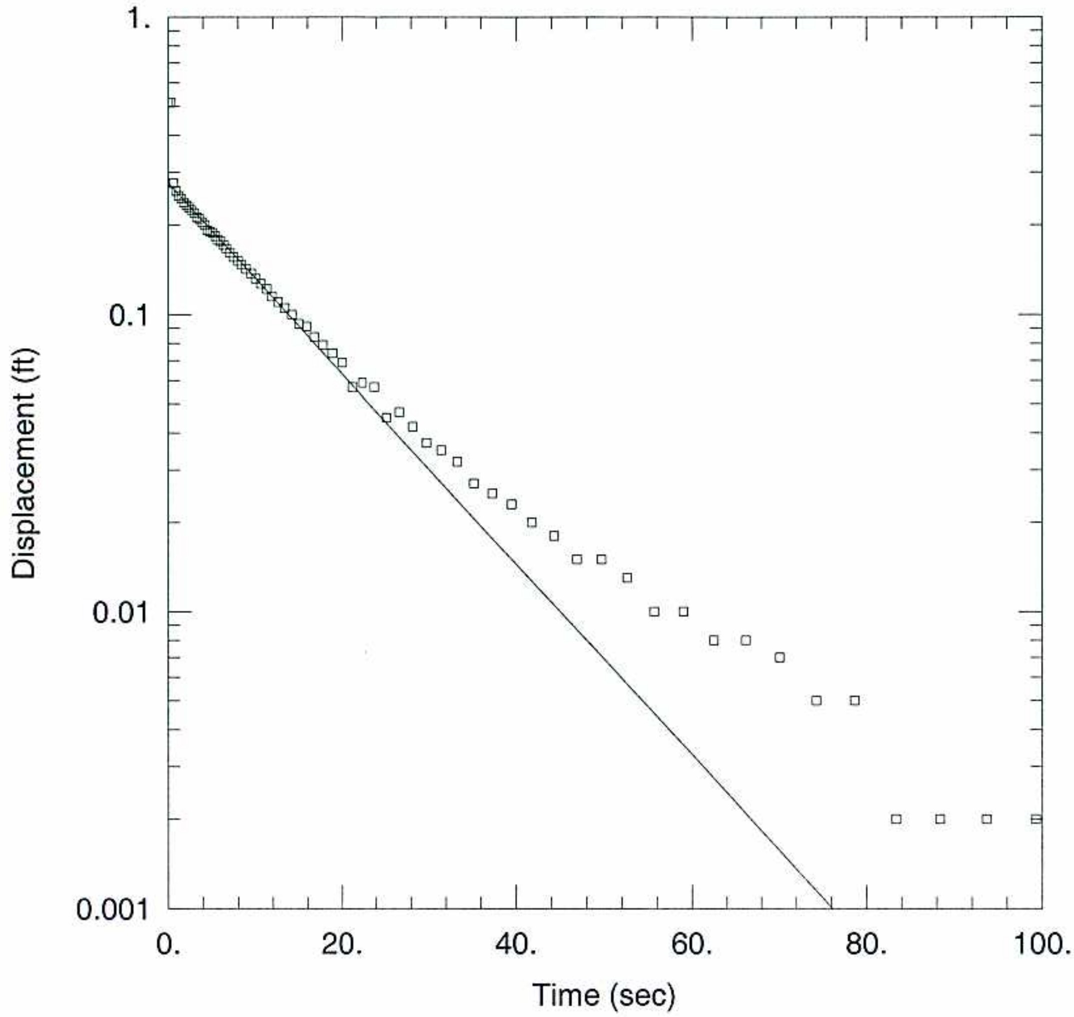
Saturated Thickness: 19.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-509D)

Initial Displacement: 3.015 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 19.1 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.006482 cm/sec
y0 = 1.058 ft



WELL TEST ANALYSIS

Data Set: \...\MW-510S rising.aqt
Date: 10/13/05 Time: 15:51:14

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-510S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.7 ft Anisotropy Ratio (Kz/Kr): 1.

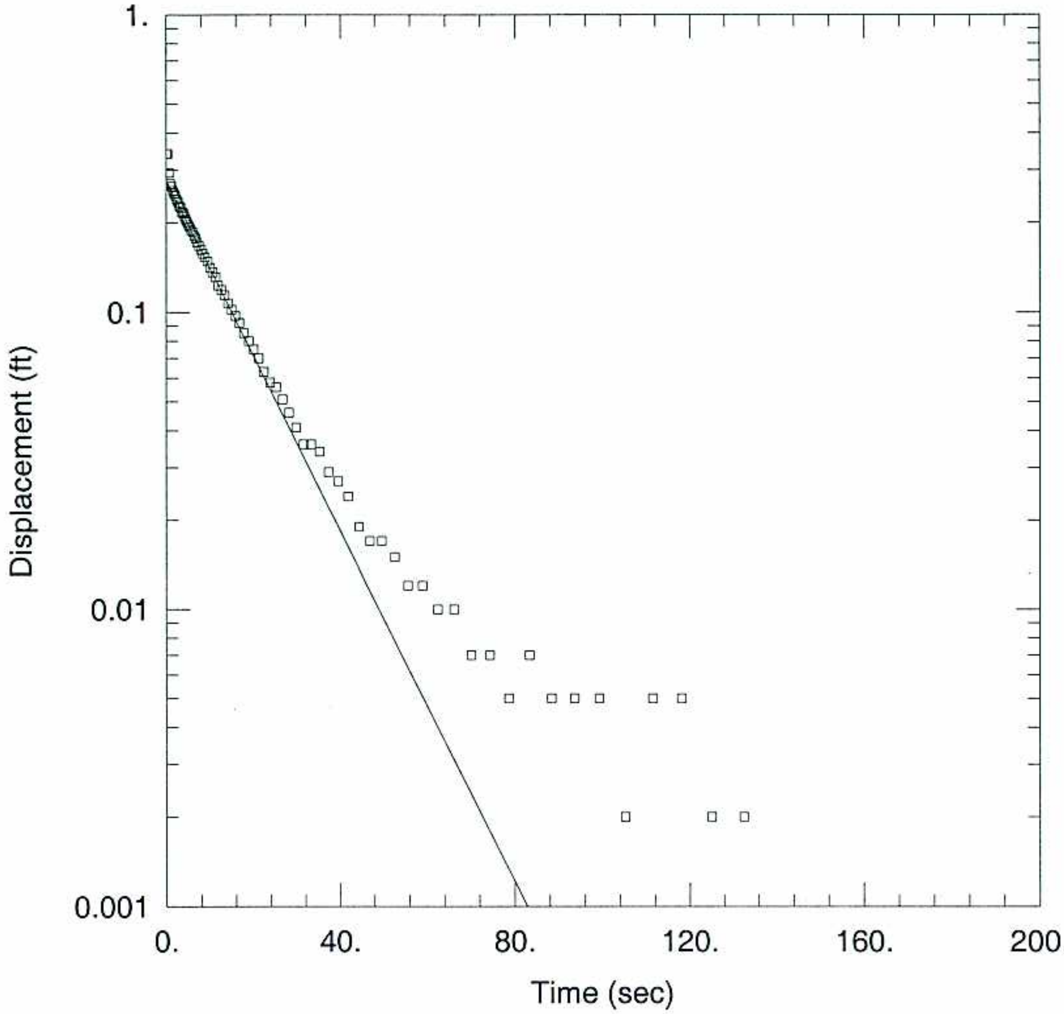
WELL DATA (MW-510S)

Initial Displacement: 0.515 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 3.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.01116 cm/sec y0 = 0.2768 ft



WELL TEST ANALYSIS

Data Set: \...\MW-510S rising2.aqt
Date: 10/13/05 | Time: 15:51:08

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-510S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 21.7 ft
Anisotropy Ratio (Kz/Kr): 1.

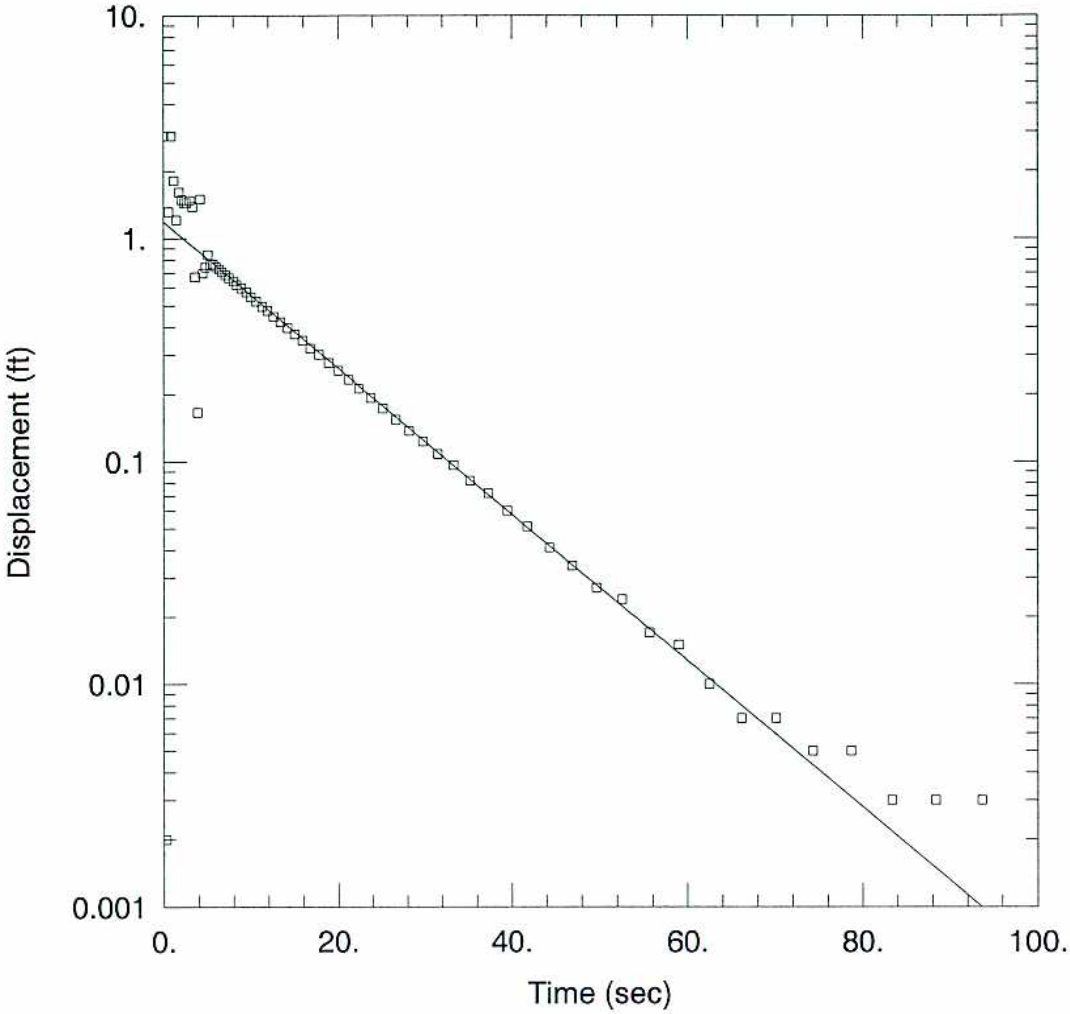
WELL DATA (MW-510S)

Initial Displacement: 0.34 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 3.7 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01025 cm/sec
y0 = 0.2767 ft



WELL TEST ANALYSIS

Data Set: \...\MW-510D falling.aqt
Date: 10/13/05 Time: 15:50:55

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-510D
Test Date: 05-09-2005

AQUIFER DATA

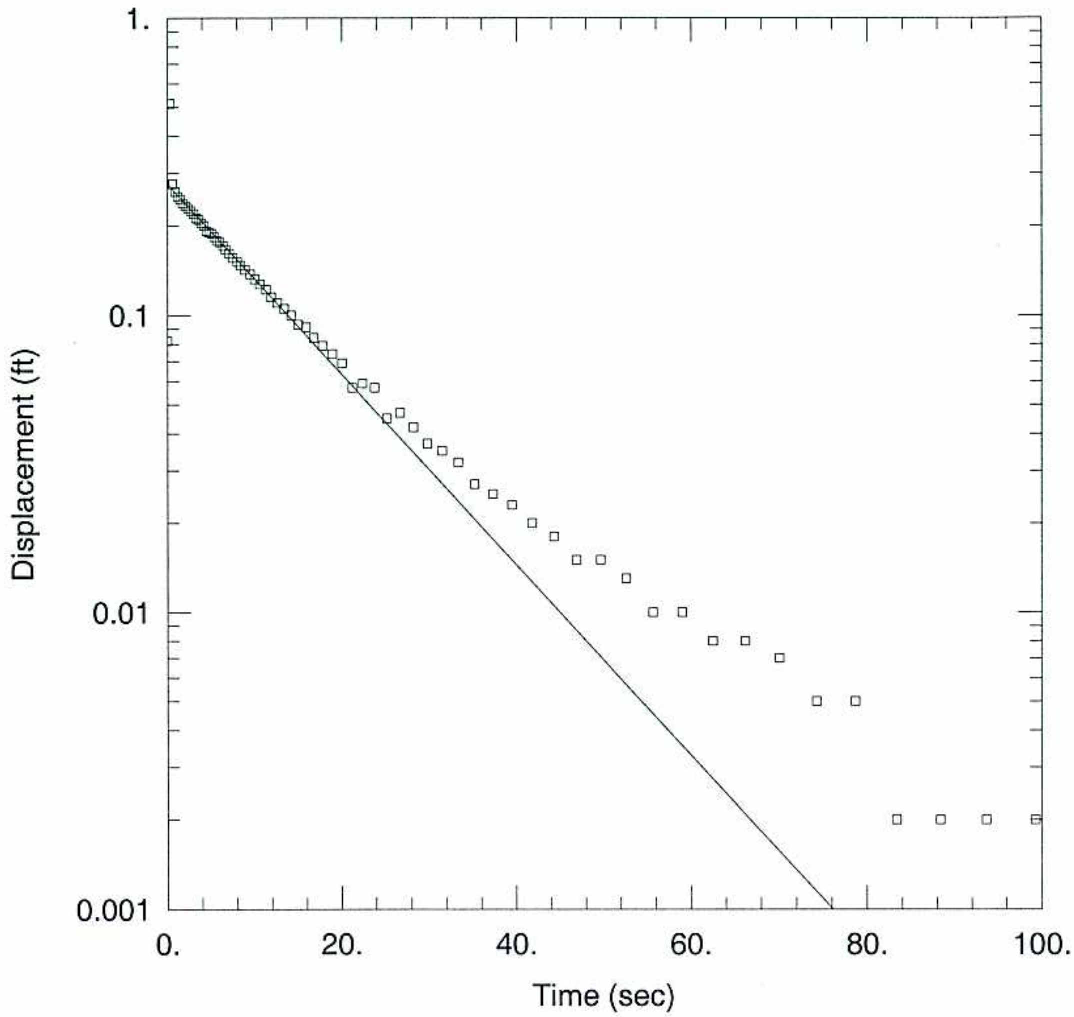
Saturated Thickness: 21.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-510D)

Initial Displacement: 2.874 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 21.7 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.004705 cm/sec
y0 = 1.187 ft



WELL TEST ANALYSIS

Data Set: \...\MW-511S rising.aqt
Date: 10/13/05 Time: 15:51:43

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-511S
Test Date: 05-09-2005

AQUIFER DATA

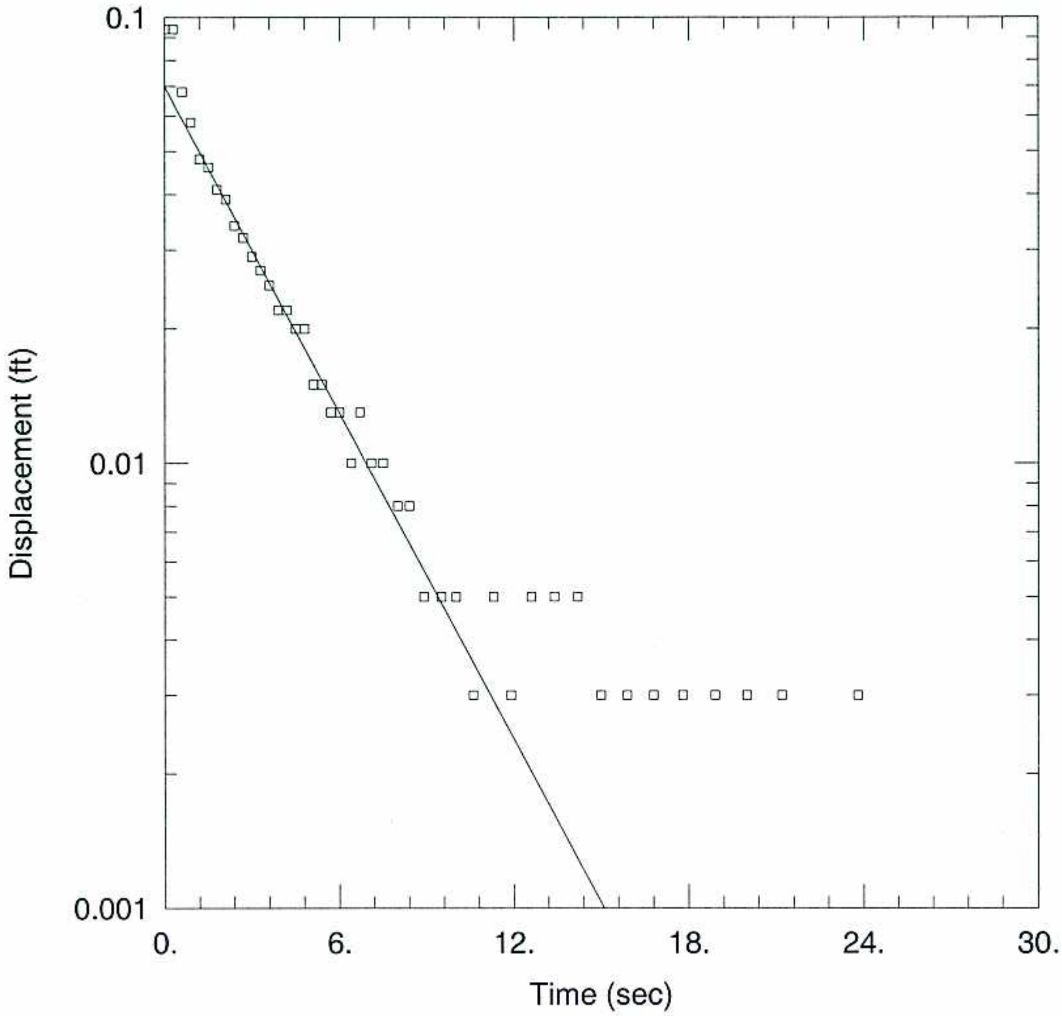
Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-511S)

Initial Displacement: 0.082 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 3.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01077 cm/sec
y0 = 0.2768 ft



WELL TEST ANALYSIS

Data Set: \...\MW-511S rising2.aqt
Date: 10/13/05 Time: 15:51:37

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-511S
Test Date: 05-09-2005

AQUIFER DATA

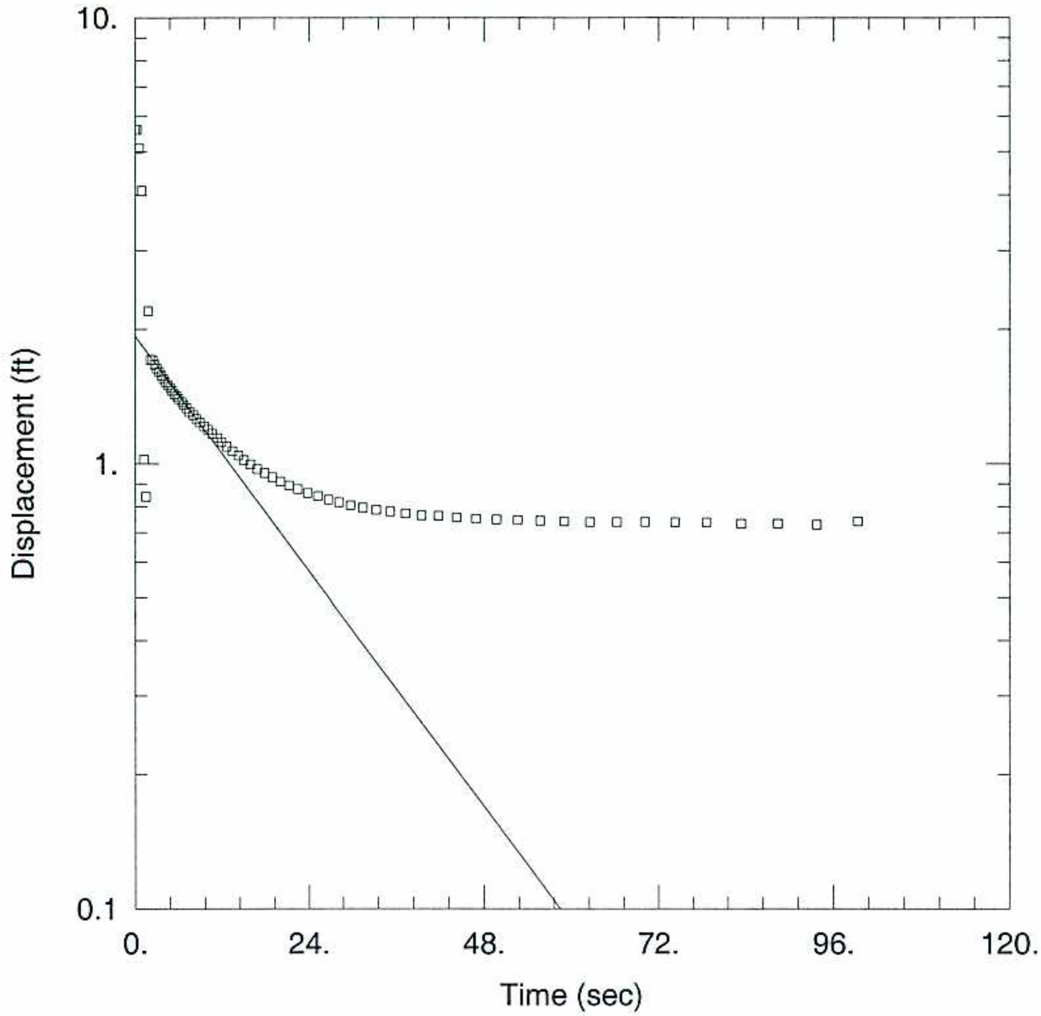
Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-511S)

Initial Displacement: 0.094 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 3.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.04099 cm/sec
y0 = 0.06975 ft



WELL TEST ANALYSIS

Data Set: \...\MW-511D rising.aqt
Date: 10/13/05 Time: 15:51:31

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-511D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft
Anisotropy Ratio (Kz/Kr): 1.

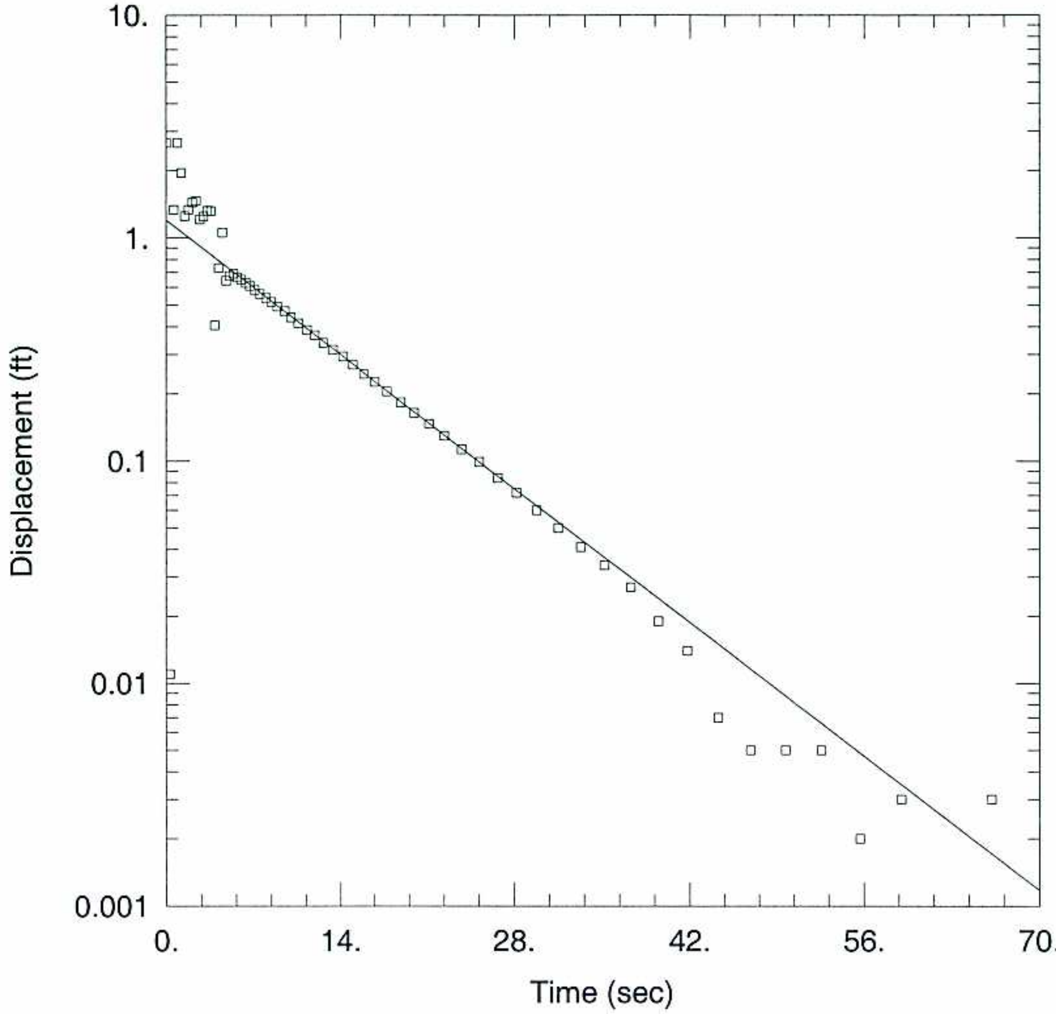
WELL DATA (MW-511D)

Initial Displacement: 5.608 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.003164 cm/sec
y0 = 1.929 ft



WELL TEST ANALYSIS

Data Set: \...\MW-511D Falling.aqt
Date: 10/13/05 Time: 15:51:21

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-511D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.2 ft Anisotropy Ratio (Kz/Kr): 1.

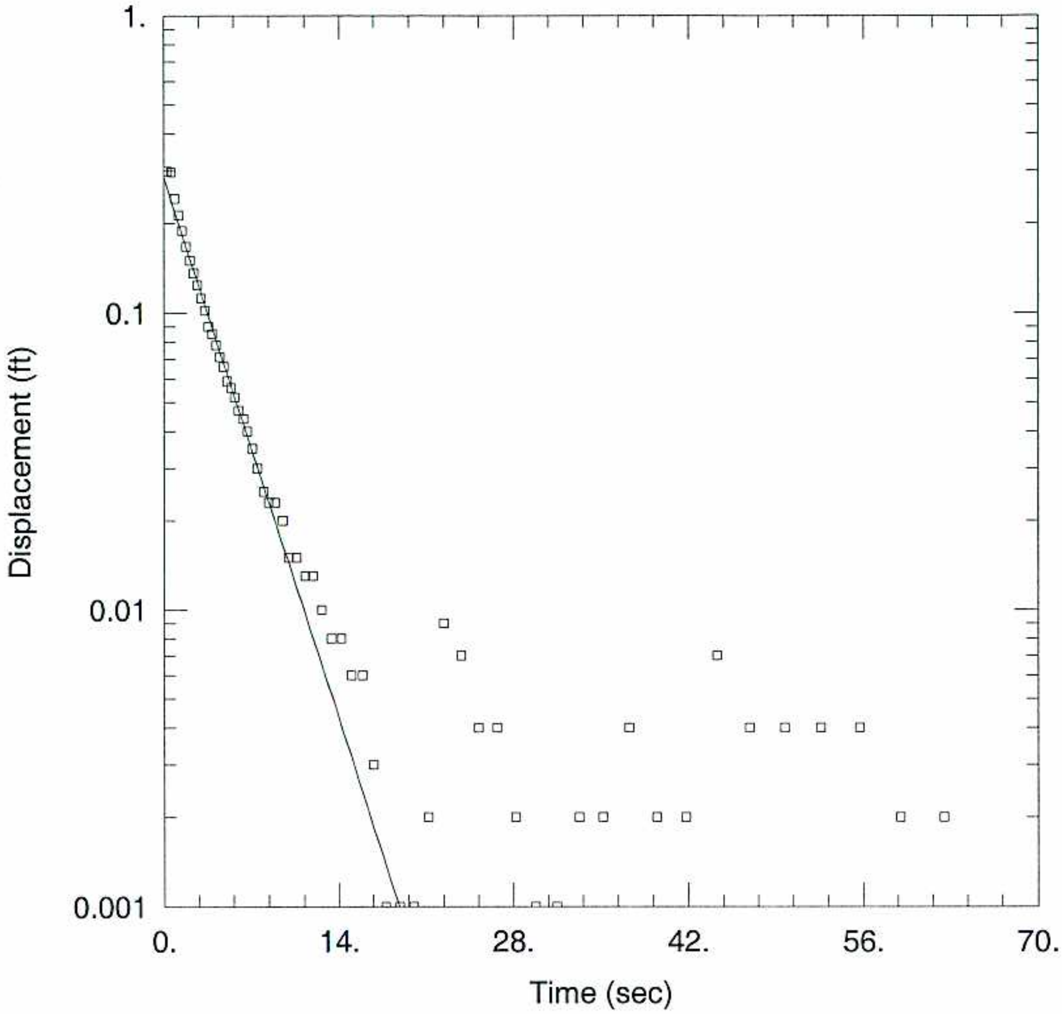
WELL DATA (MW-511D)

Initial Displacement: 2.662 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 22.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.006185 cm/sec y0 = 1.199 ft



WELL TEST ANALYSIS

Data Set: \...\MW-512S rising.aqt
Date: 10/13/05 Time: 15:52:59

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-512S
Test Date: 05-09-2005

AQUIFER DATA

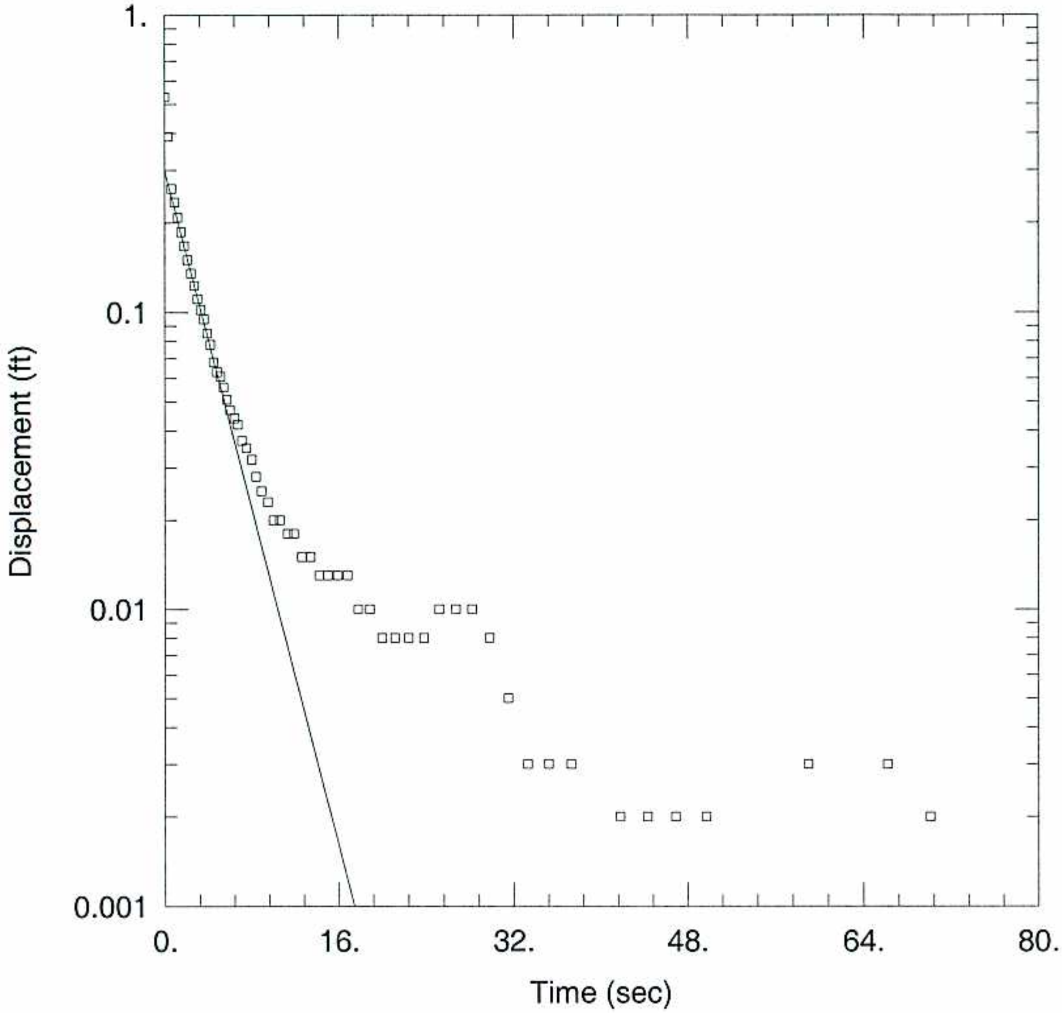
Saturated Thickness: 22.7 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-512S)

Initial Displacement: 0.299 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 5.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.01104 cm/sec y0 = 0.2861 ft



WELL TEST ANALYSIS

Data Set: \...\MW-512S rising2.aqt
Date: 10/13/05 Time: 15:52:52

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-512S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.7 ft
Anisotropy Ratio (Kz/Kr): 1.

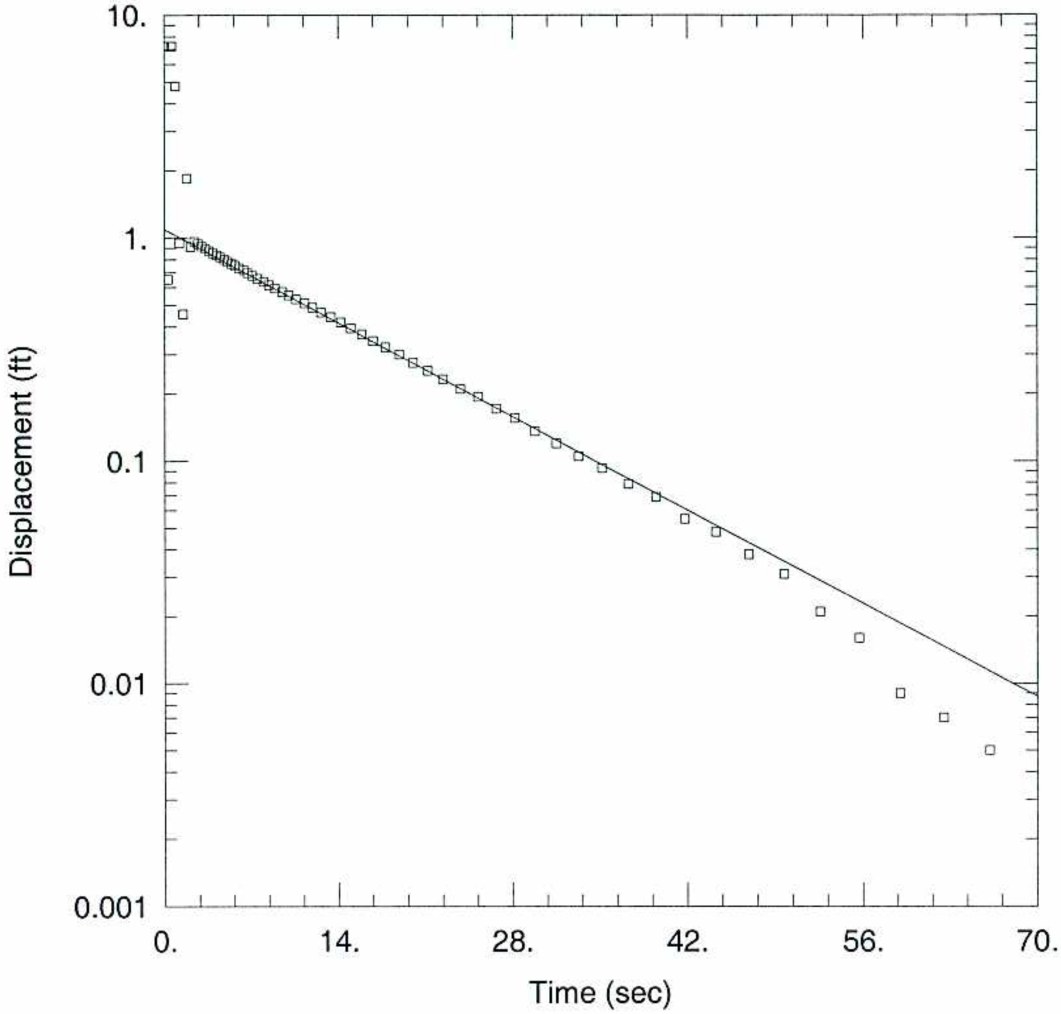
WELL DATA (MW-512S)

Initial Displacement: 0.53 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 5.2 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01203 cm/sec
y0 = 0.2988 ft



WELL TEST ANALYSIS

Data Set: \...\MW-512D rising.aqt
Date: 10/13/05 Time: 15:52:46

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-512D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.7 ft Anisotropy Ratio (Kz/Kr): 1.

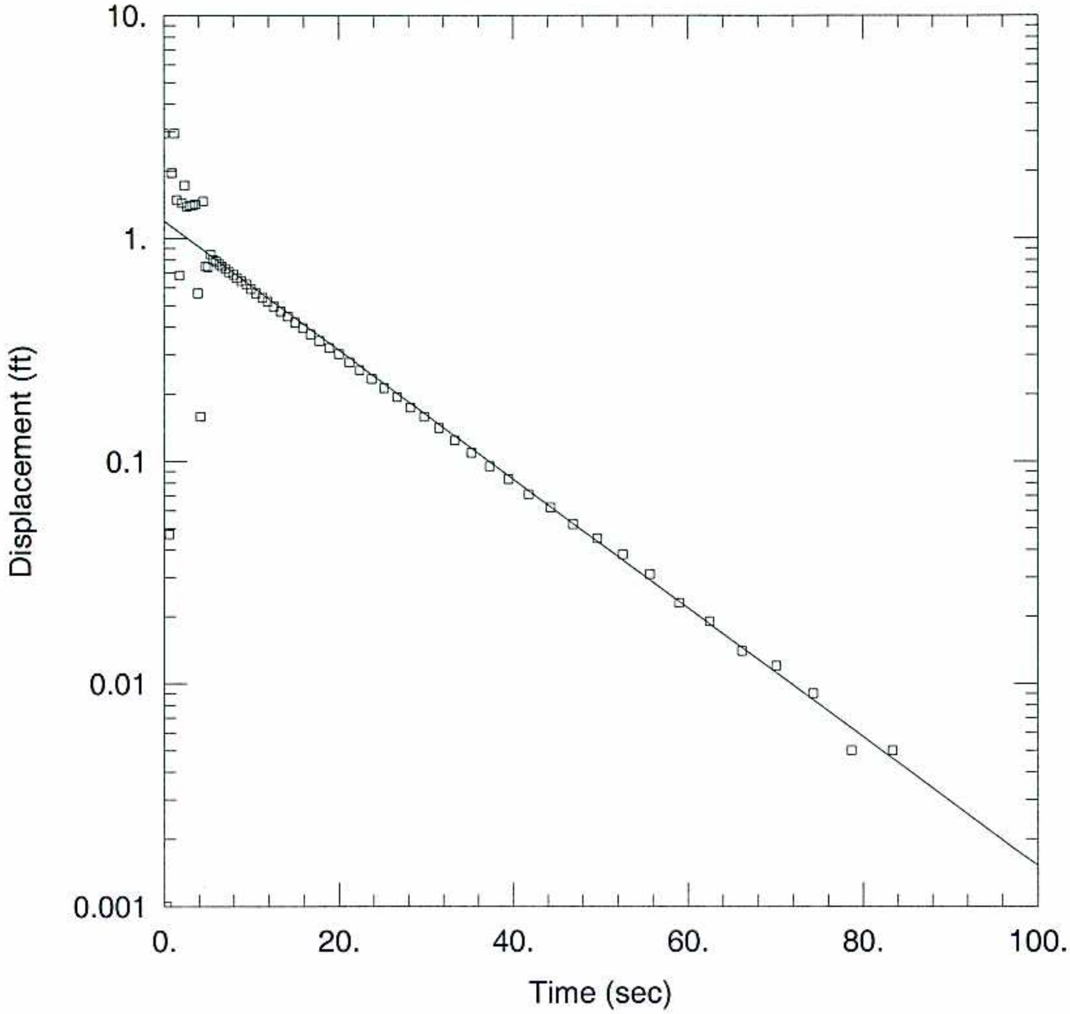
WELL DATA (MW-512D)

Initial Displacement: 7.243 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 22.7 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.004329 cm/sec y0 = 1.092 ft



WELL TEST ANALYSIS	
Data Set: \...\MW-512D Falling.aqt	
Date: 10/13/05	Time: 15:52:40

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-512D
Test Date: 05-09-2005

AQUIFER DATA

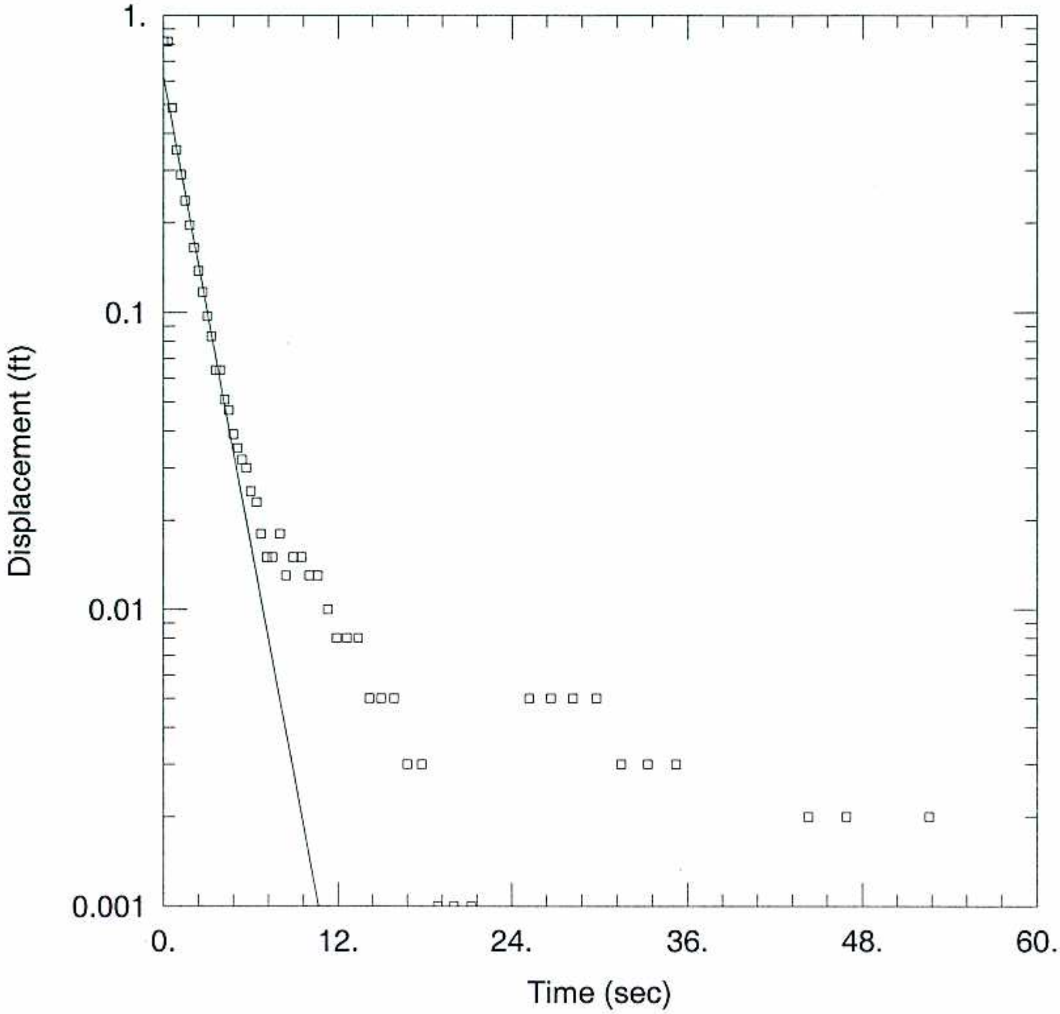
Saturated Thickness: 22.7 ft	Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-512D)

Initial Displacement: 2.956 ft	Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft	Well Skin Radius: 0.333 ft
Screen Length: 5. ft	Total Well Penetration Depth: 22.7 ft
Gravel Pack Porosity: 0.25	

SOLUTION

Aquifer Model: Unconfined	Solution Method: Bouwer-Rice
K = 0.004182 cm/sec	y0 = 1.194 ft



WELL TEST ANALYSIS

Data Set: \...\MW-513S rising.aqt
Date: 10/13/05 Time: 15:53:53

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-513S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft Anisotropy Ratio (Kz/Kr): 1.

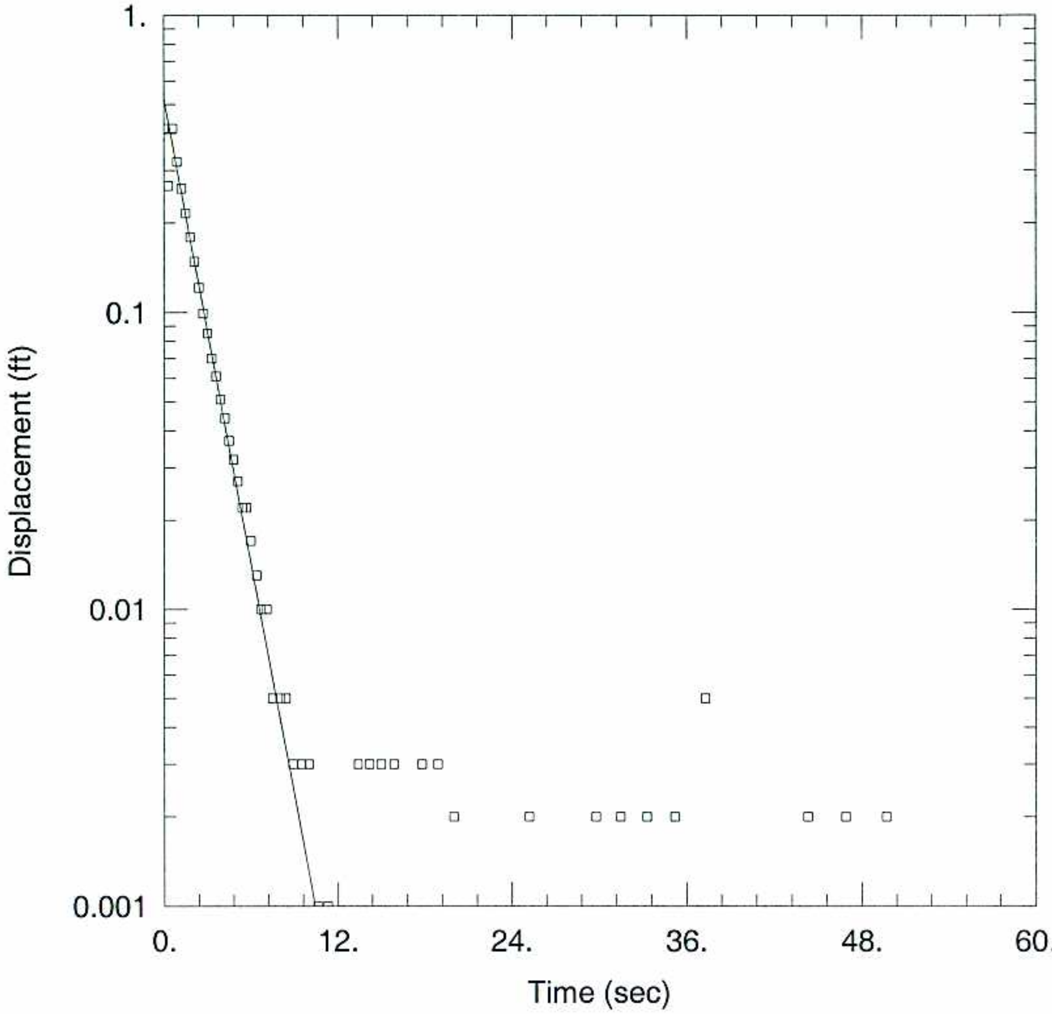
WELL DATA (MW-513S)

Initial Displacement: 0.815 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 4.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.09623 cm/sec y0 = 0.6207 ft



WELL TEST ANALYSIS

Data Set: \...\MW-513S rising2.aqt
Date: 10/13/05 Time: 15:53:46

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-513S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft Anisotropy Ratio (Kz/Kr): 1.

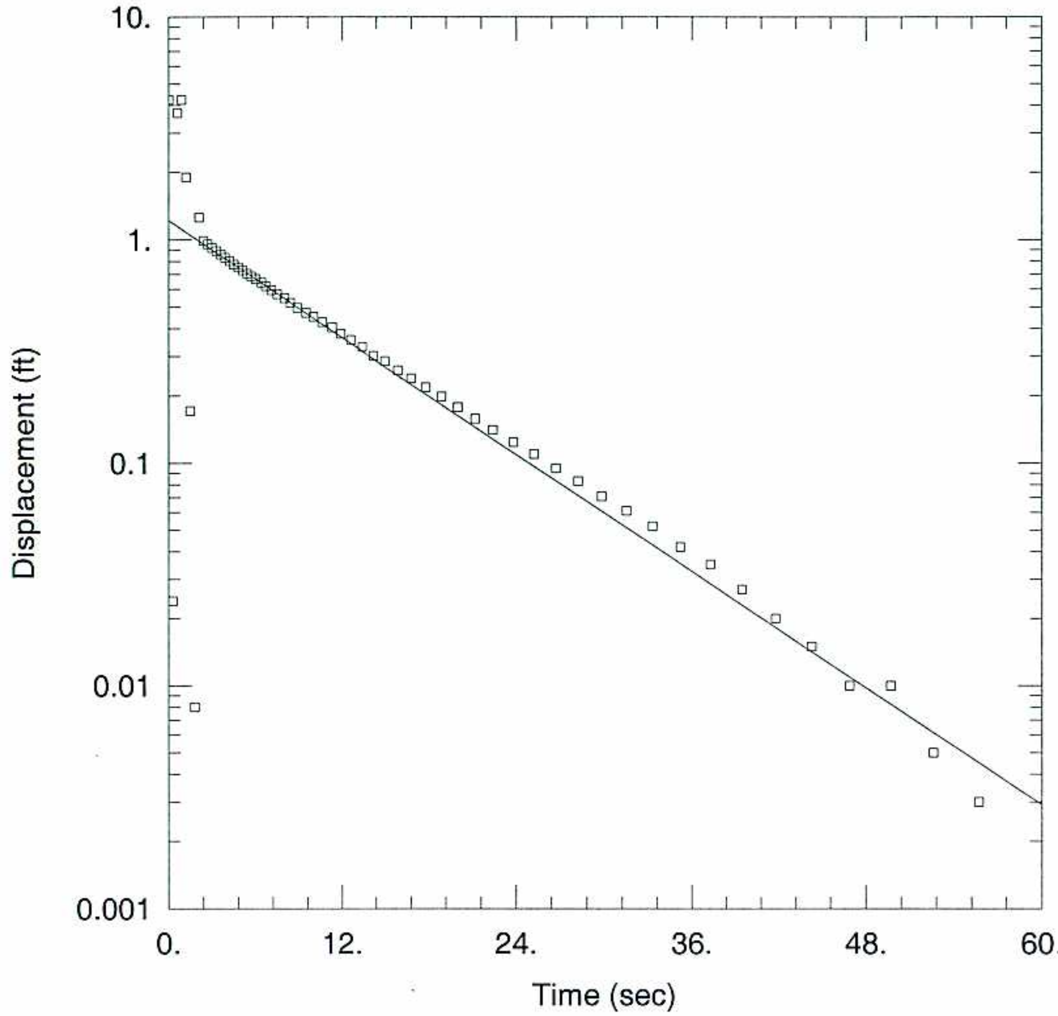
WELL DATA (MW-513S)

Initial Displacement: 0.415 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 4.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.09554 cm/sec y0 = 0.5222 ft



WELL TEST ANALYSIS

Data Set: \...\MW-513D rising.aqt
Date: 10/13/05 | Time: 15:53:38

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-513D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft | Anisotropy Ratio (Kz/Kr): 1.

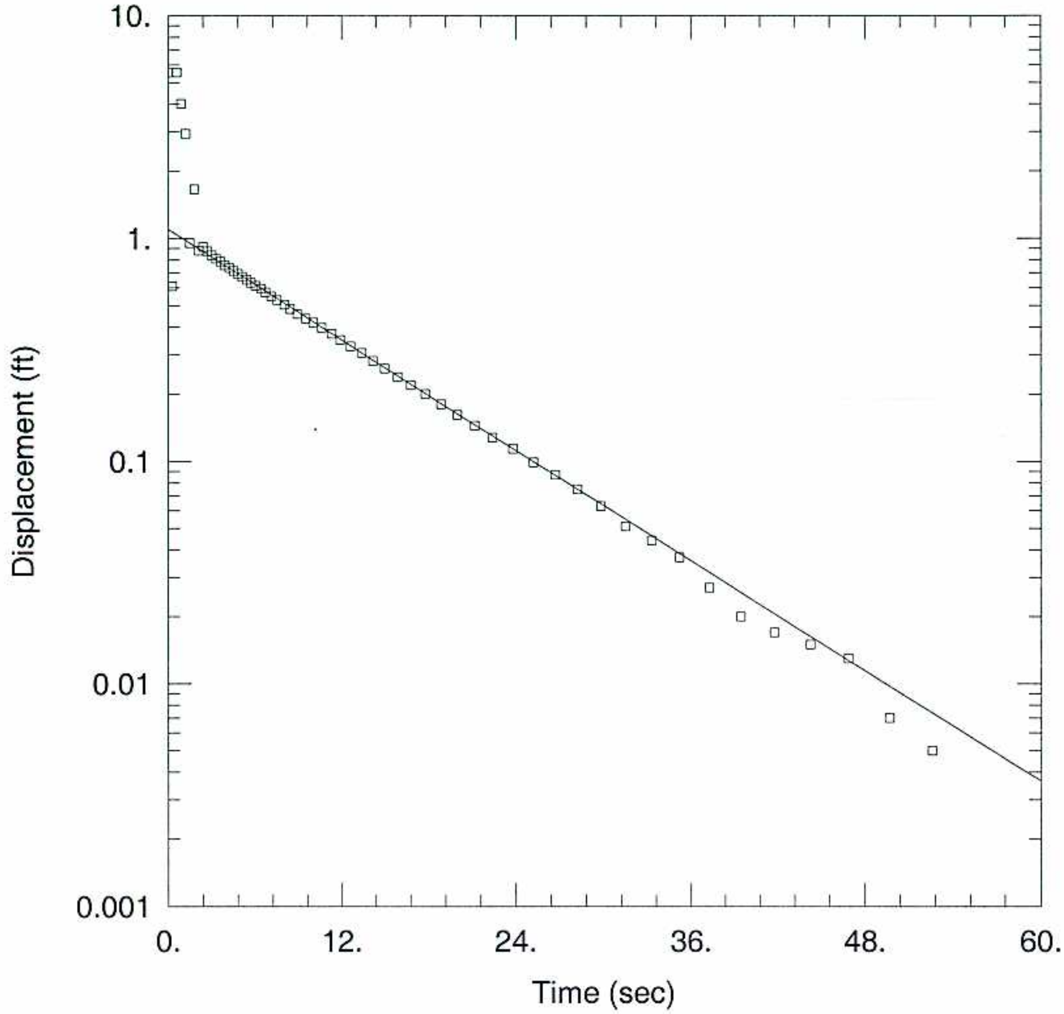
WELL DATA (MW-513D)

Initial Displacement: 4.245 ft | Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft | Well Skin Radius: 0.333 ft
Screen Length: 5. ft | Total Well Penetration Depth: 22. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined | Solution Method: Bouwer-Rice

K = 0.006275 cm/sec | y0 = 1.219 ft



WELL TEST ANALYSIS

Data Set: \...\MW-513D rising2.aqt
Date: 10/13/05 Time: 15:53:23

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-513D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft
Anisotropy Ratio (Kz/Kr): 1.

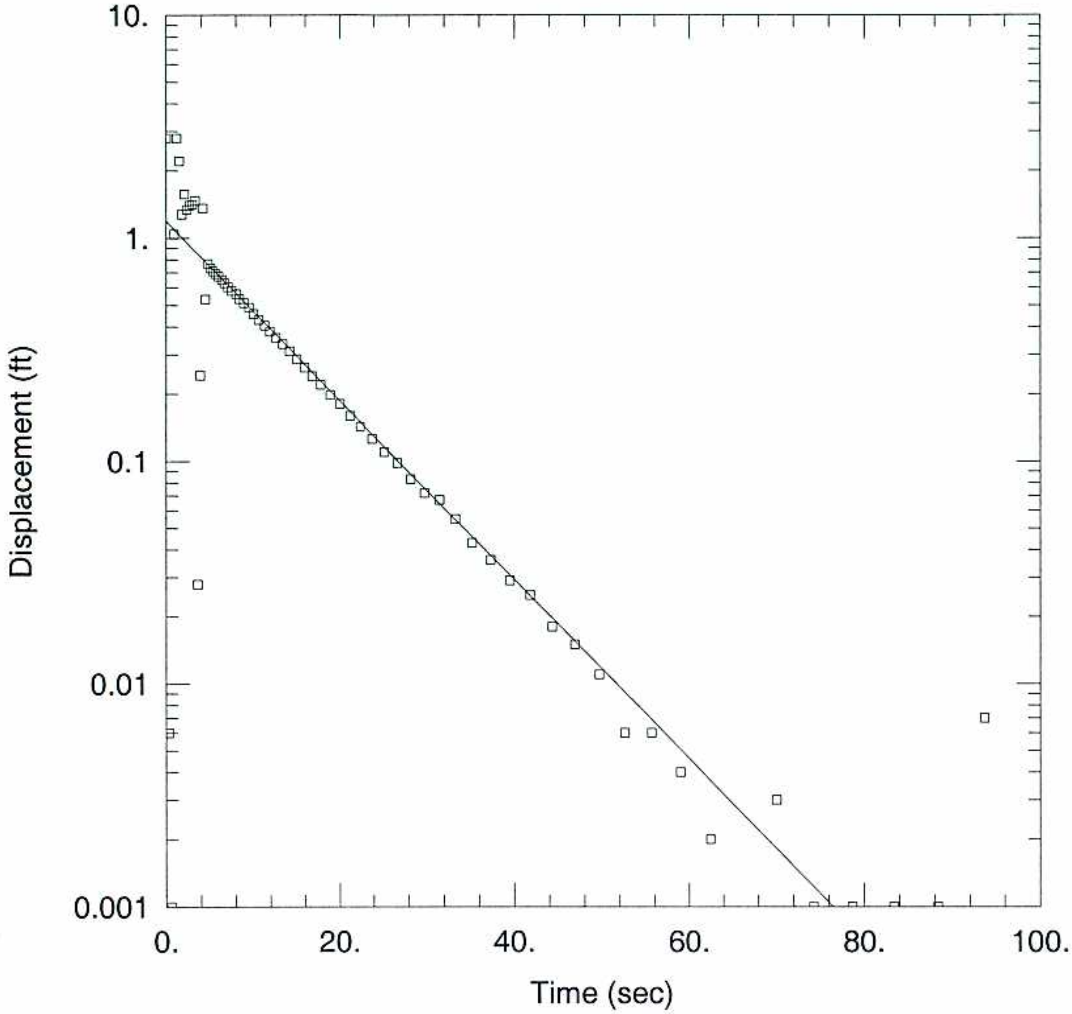
WELL DATA (MW-513D)

Initial Displacement: 5.549 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.005932 cm/sec
y0 = 1.097 ft



WELL TEST ANALYSIS

Data Set: \...\MW-513D Falling.aqt
Date: 10/13/05 Time: 15:53:14

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-513D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft Anisotropy Ratio (Kz/Kr): 1.

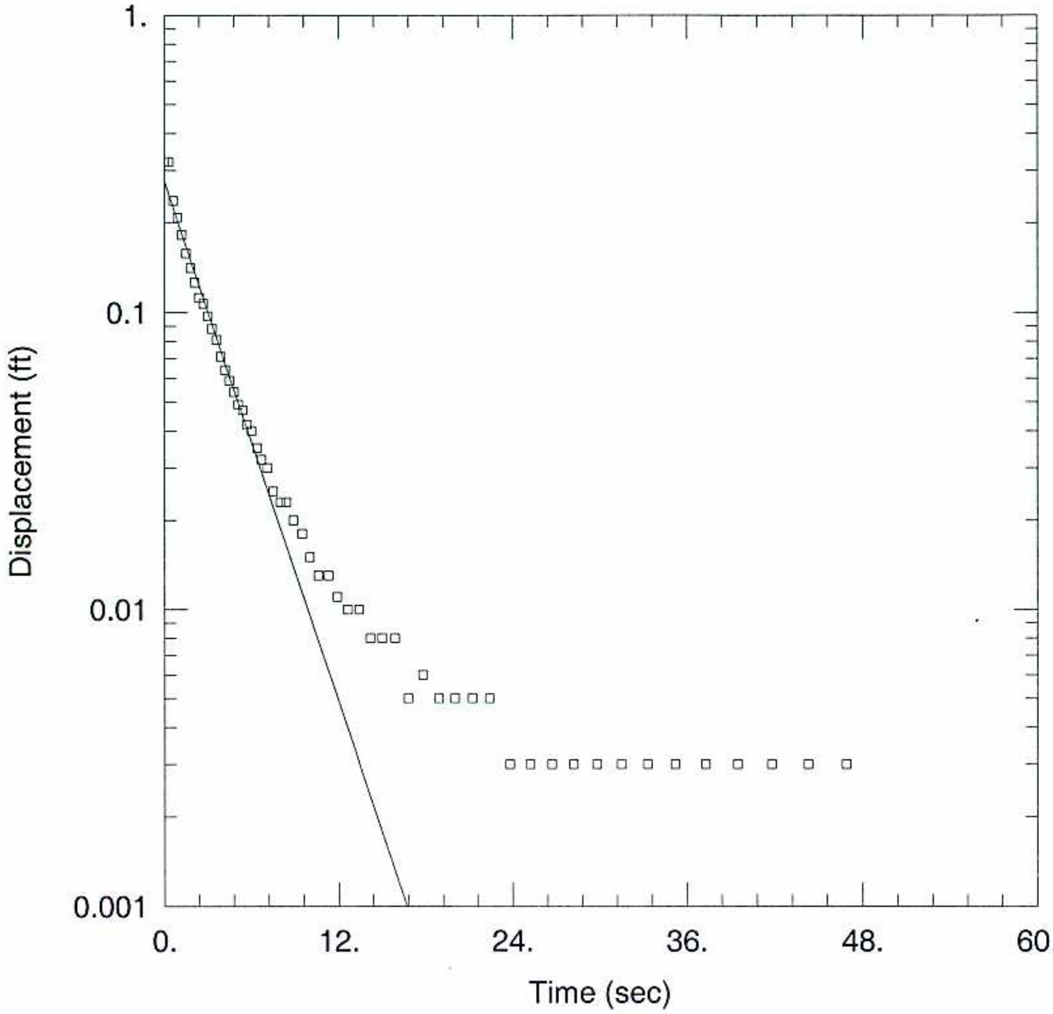
WELL DATA (MW-513D)

Initial Displacement: 2.794 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 22. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.005771 cm/sec y0 = 1.186 ft



WELL TEST ANALYSIS

Data Set: \...\MW-514S rising.aqt
Date: 10/13/05 Time: 15:54:31

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-514S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.3 ft Anisotropy Ratio (Kz/Kr): 1.

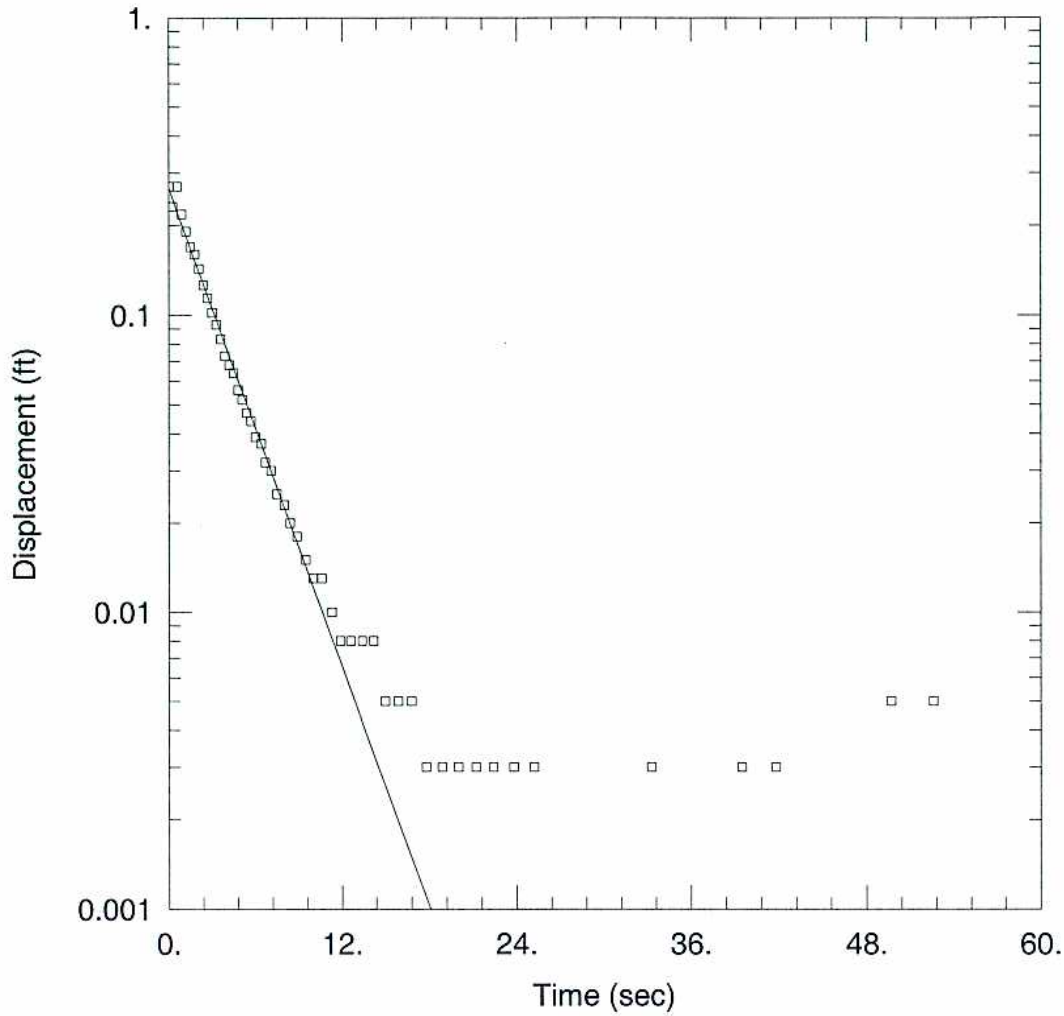
WELL DATA (MW-514S)

Initial Displacement: 0.321 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 4.8 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.05441 cm/sec y0 = 0.2754 ft



WELL TEST ANALYSIS

Data Set: \...\MW-514S rising2.aqt
Date: 10/13/05 Time: 15:54:16

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-514S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.3 ft
Anisotropy Ratio (Kz/Kr): 1.

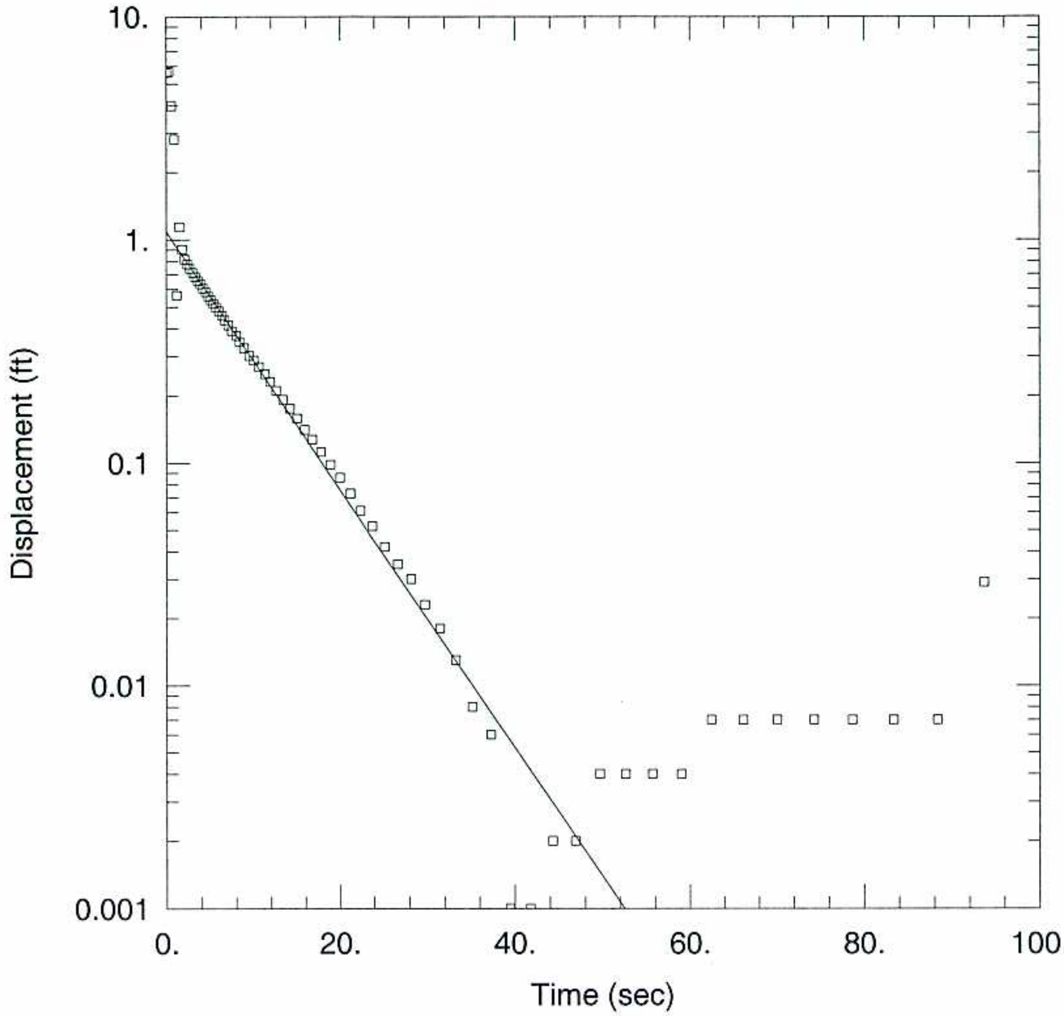
WELL DATA (MW-514S)

Initial Displacement: 0.27 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 4.8 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01114 cm/sec
y0 = 0.2669 ft



WELL TEST ANALYSIS

Data Set: \...\MW-514D rising.aqt
Date: 10/13/05 Time: 15:54:08

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-514D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22.3 ft
Anisotropy Ratio (Kz/Kr): 1.

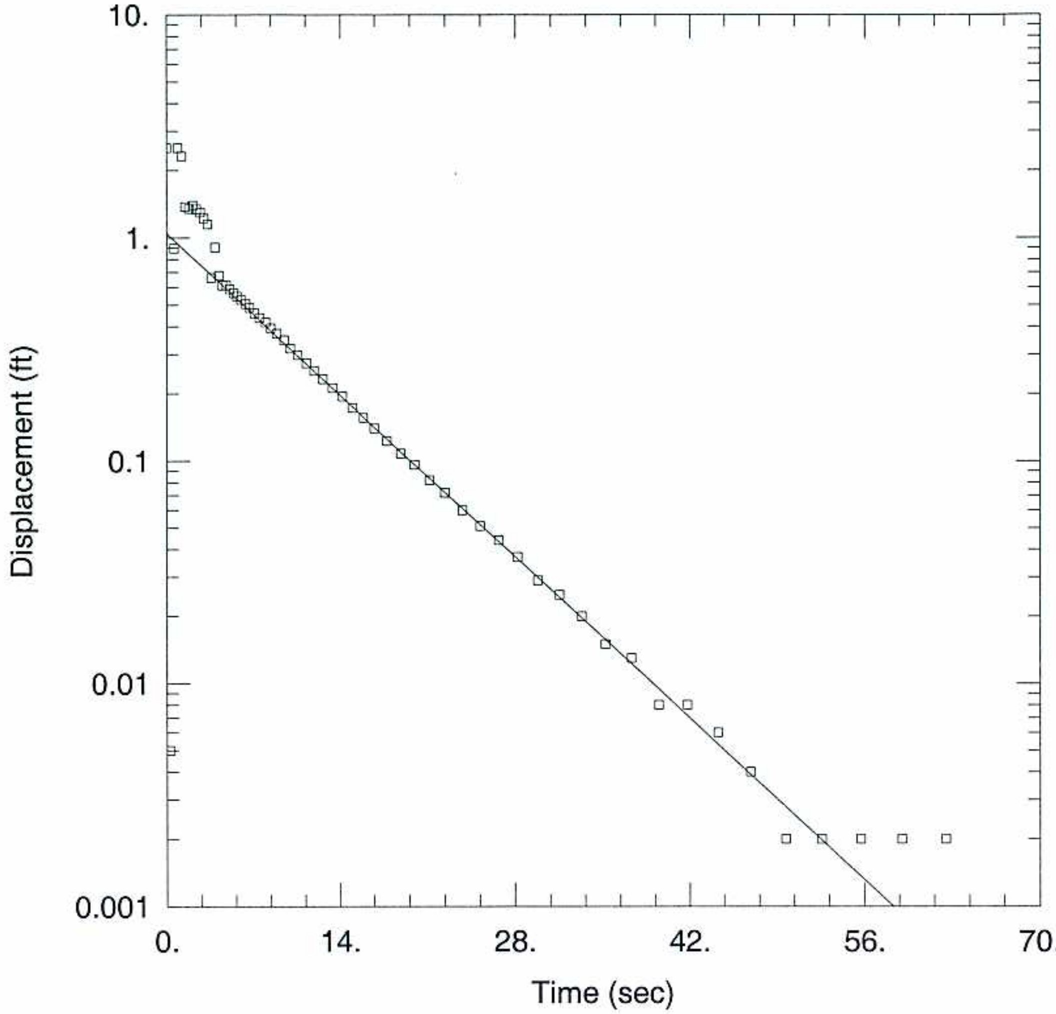
WELL DATA (MW-514D)

Initial Displacement: 5.617 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.008327 cm/sec
y0 = 1.084 ft



WELL TEST ANALYSIS

Data Set: \...\MW-514D Falling.aqt
Date: 10/13/05 Time: 15:54:00

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-514D
Test Date: 05-09-2005

AQUIFER DATA

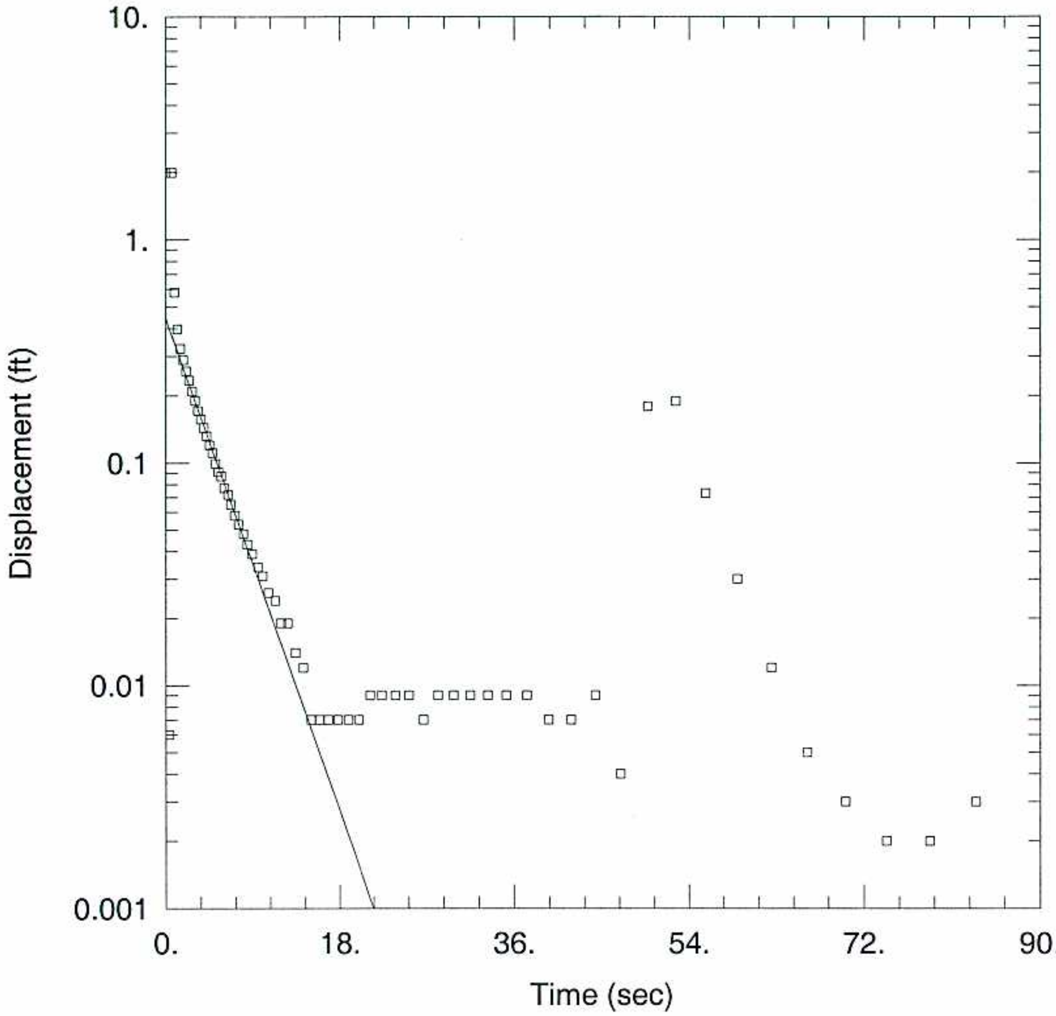
Saturated Thickness: 22.3 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-514D)

Initial Displacement: 2.526 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 22.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.007455 cm/sec y0 = 1.044 ft



WELL TEST ANALYSIS

Data Set: \...\MW-515S rising.aqt
Date: 10/13/05
Time: 15:55:04

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-515S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 24.3 ft
Anisotropy Ratio (Kz/Kr): 1.

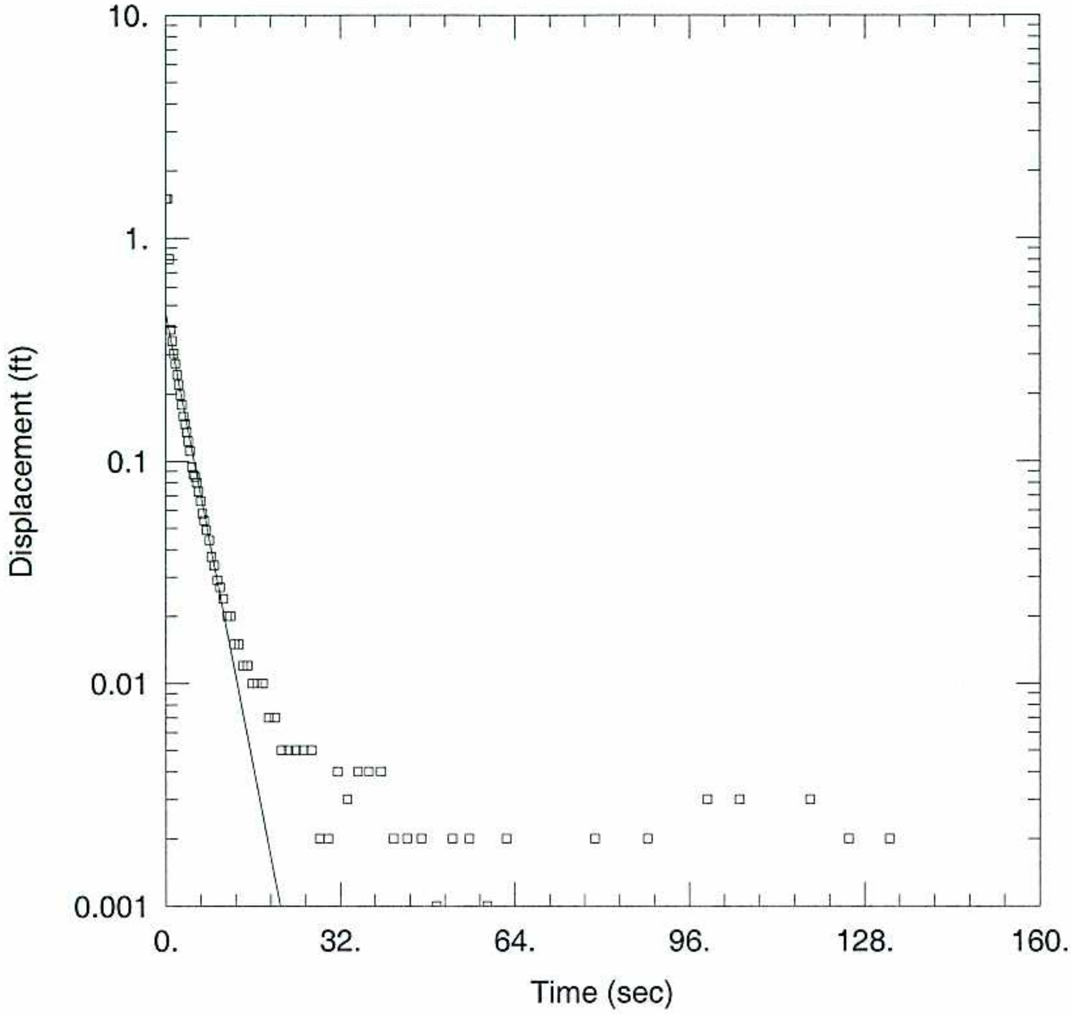
WELL DATA (MW-515S)

Initial Displacement: 1.996 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 6.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01084 cm/sec
y0 = 0.4431 ft



WELL TEST ANALYSIS

Data Set: \...\MW-515S rising2.aqt
Date: 10/13/05 Time: 15:54:55

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-515S
Test Date: 05-09-2005

AQUIFER DATA

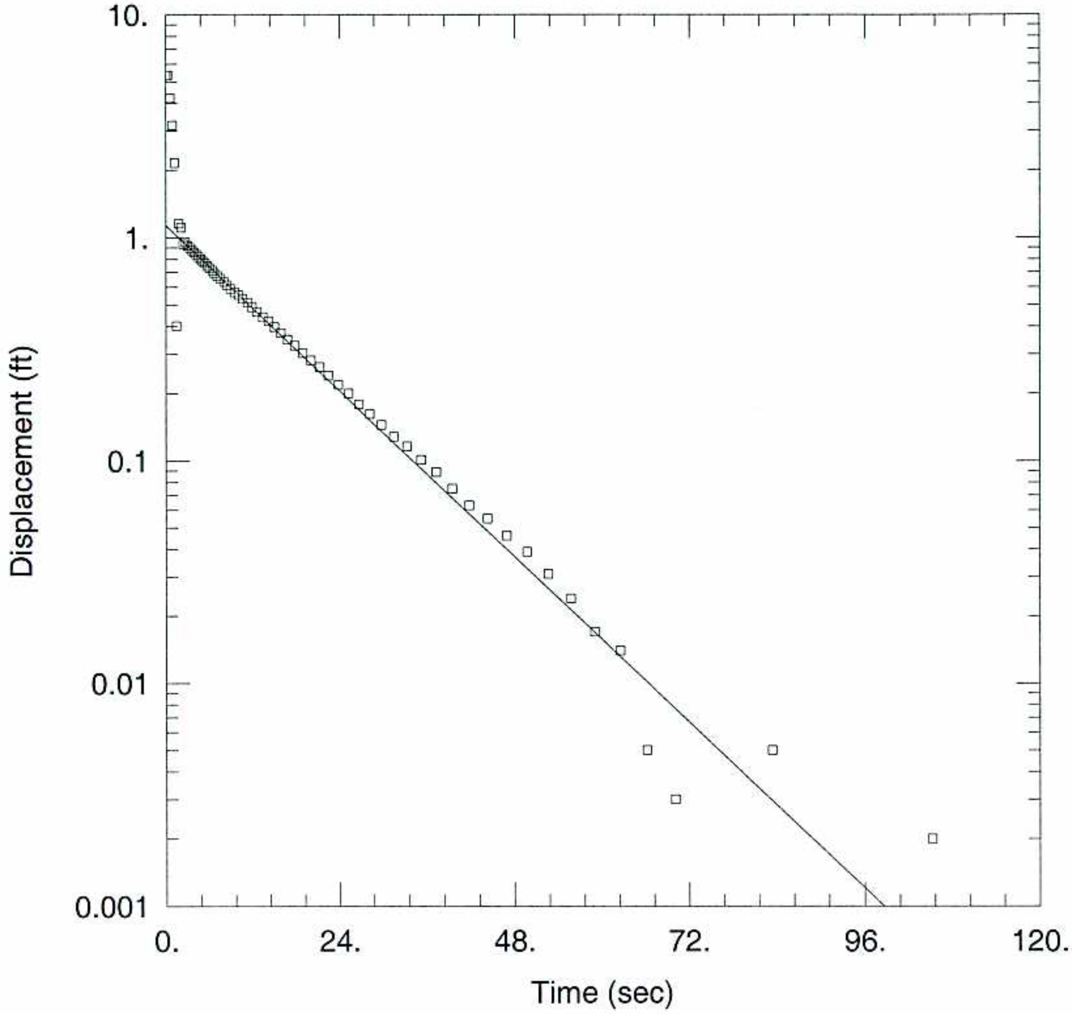
Saturated Thickness: 24.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-515S)

Initial Displacement: 1.497 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 6.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.01121 cm/sec
y0 = 0.4584 ft



WELL TEST ANALYSIS

Data Set: \...\MW-515D rising.aqt
Date: 10/13/05 Time: 15:54:44

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-515D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 24.3 ft
Anisotropy Ratio (Kz/Kr): 1.

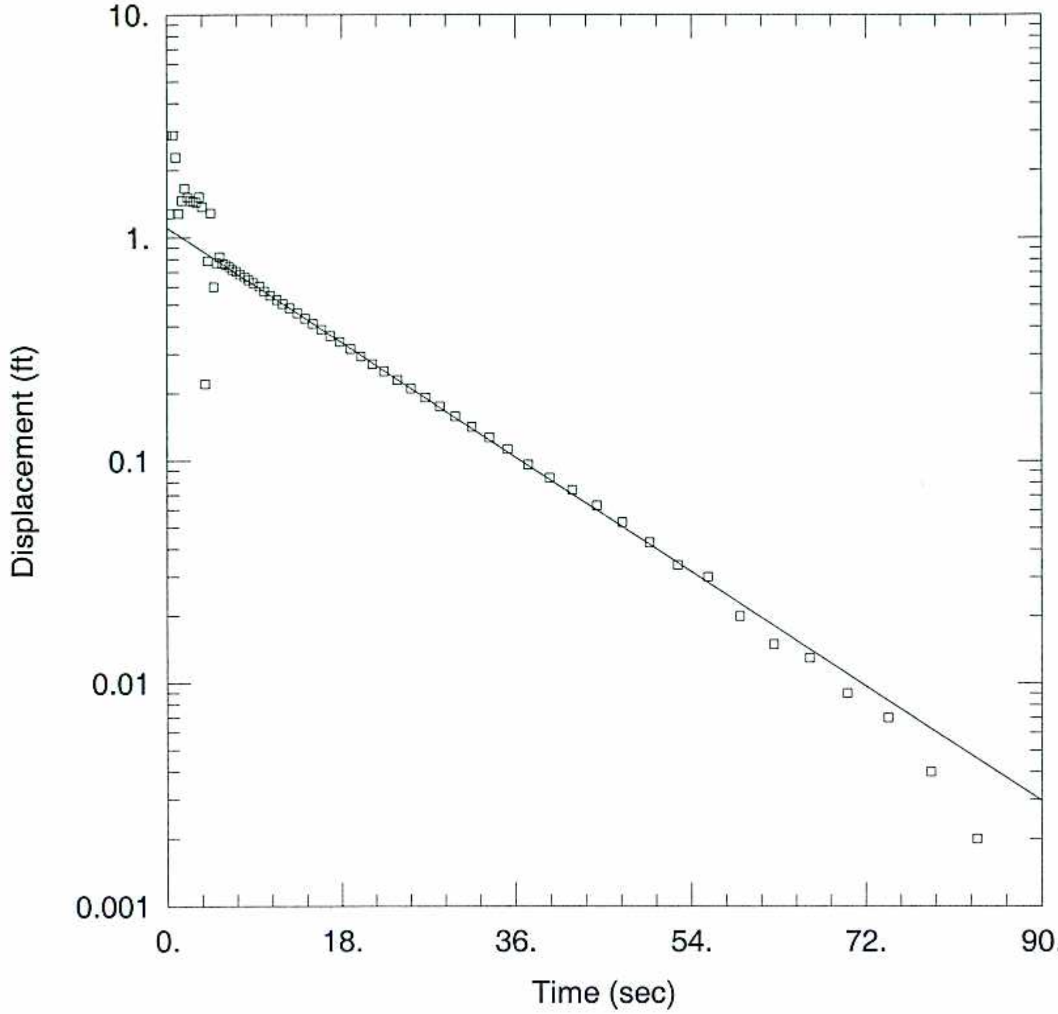
WELL DATA (MW-515D)

Initial Displacement: 5.356 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 24.3 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.004525 cm/sec
y0 = 1.133 ft



WELL TEST ANALYSIS

Data Set: \...\MW-515D Falling.aqt
Date: 10/13/05 Time: 15:54:38

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-515D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 24.3 ft Anisotropy Ratio (Kz/Kr): 1.

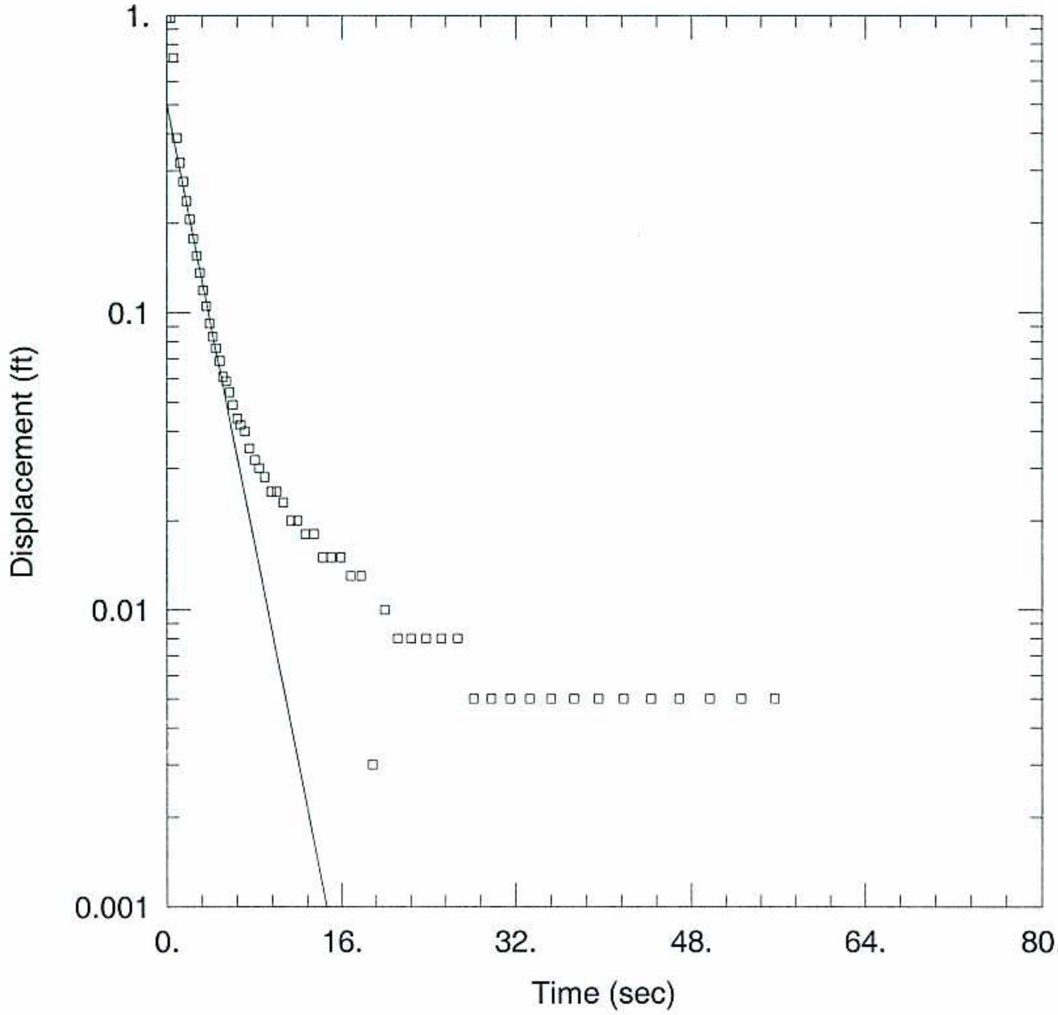
WELL DATA (MW-515D)

Initial Displacement: 2.871 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 24.3 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.004172 cm/sec y0 = 1.106 ft



WELL TEST ANALYSIS

Data Set: \...\MW-516S rising.aqt
Date: 10/13/05 Time: 15:55:43

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-516S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft
Anisotropy Ratio (Kz/Kr): 1.

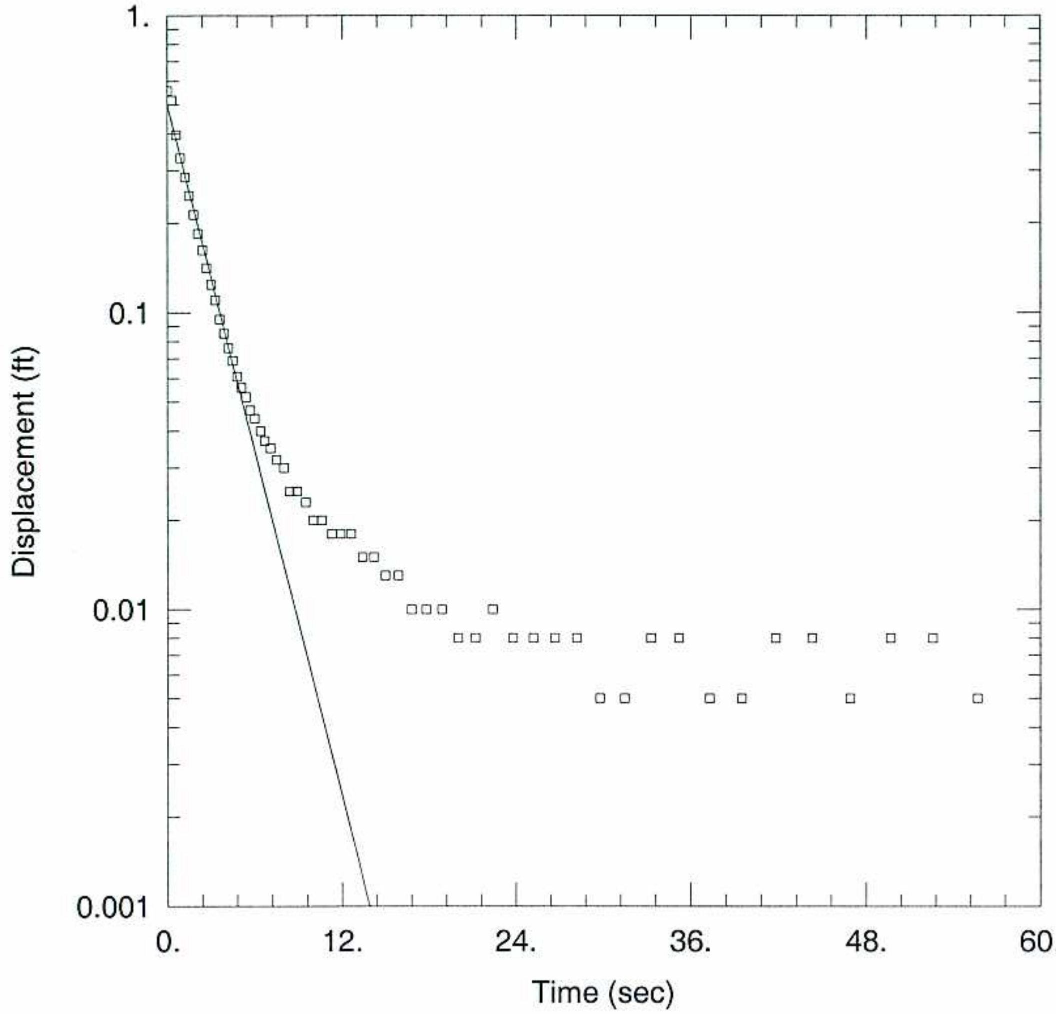
WELL DATA (MW-516S)

Initial Displacement: 0.982 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 4.9 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.06944 cm/sec
y0 = 0.5012 ft



WELL TEST ANALYSIS

Data Set: \...\MW-516S rising2.aqt
Date: 10/13/05 Time: 15:55:33

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-516S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft
Anisotropy Ratio (Kz/Kr): 1.

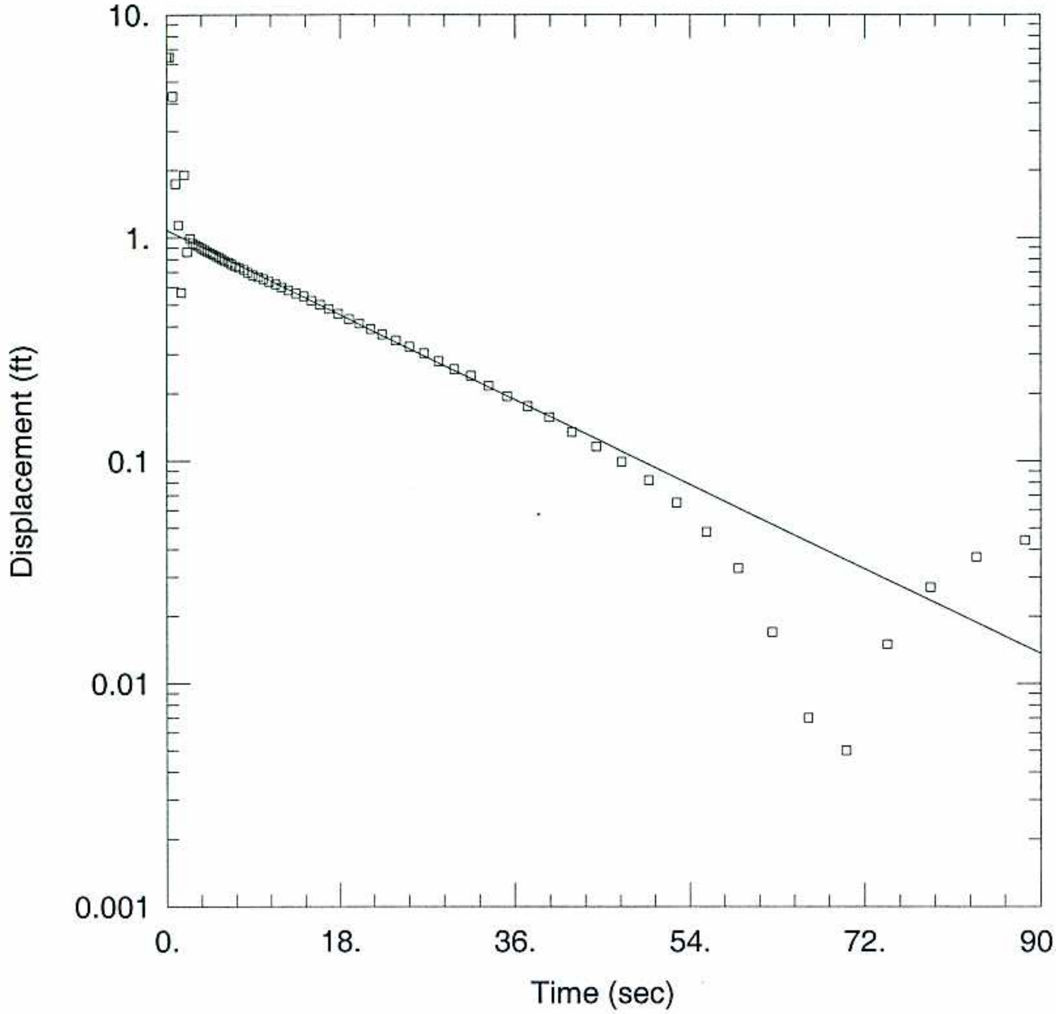
WELL DATA (MW-516S)

Initial Displacement: 0.557 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 4.9 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.07275 cm/sec
y0 = 0.5009 ft



WELL TEST ANALYSIS

Data Set: \...\MW-516D Rising.aqt
Date: 10/13/05 Time: 15:55:26

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-516D
Test Date: 05-09-2005

AQUIFER DATA

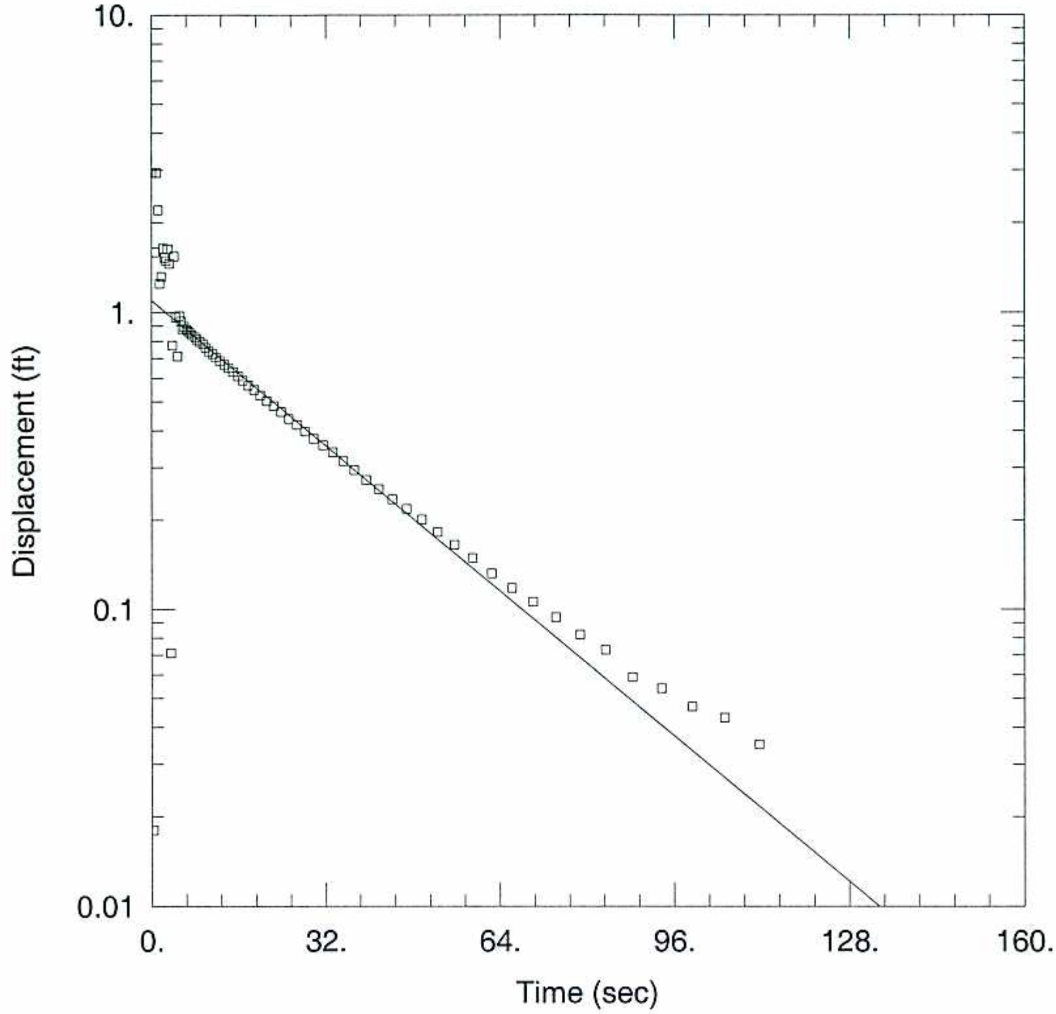
Saturated Thickness: 22. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-516D)

Initial Displacement: 6.441 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.003029 cm/sec
y0 = 1.08 ft



WELL TEST ANALYSIS

Data Set: \...\MW-516D Falling.aqt
Date: 10/13/05 Time: 15:55:13

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-516D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 22. ft
Anisotropy Ratio (Kz/Kr): 1.

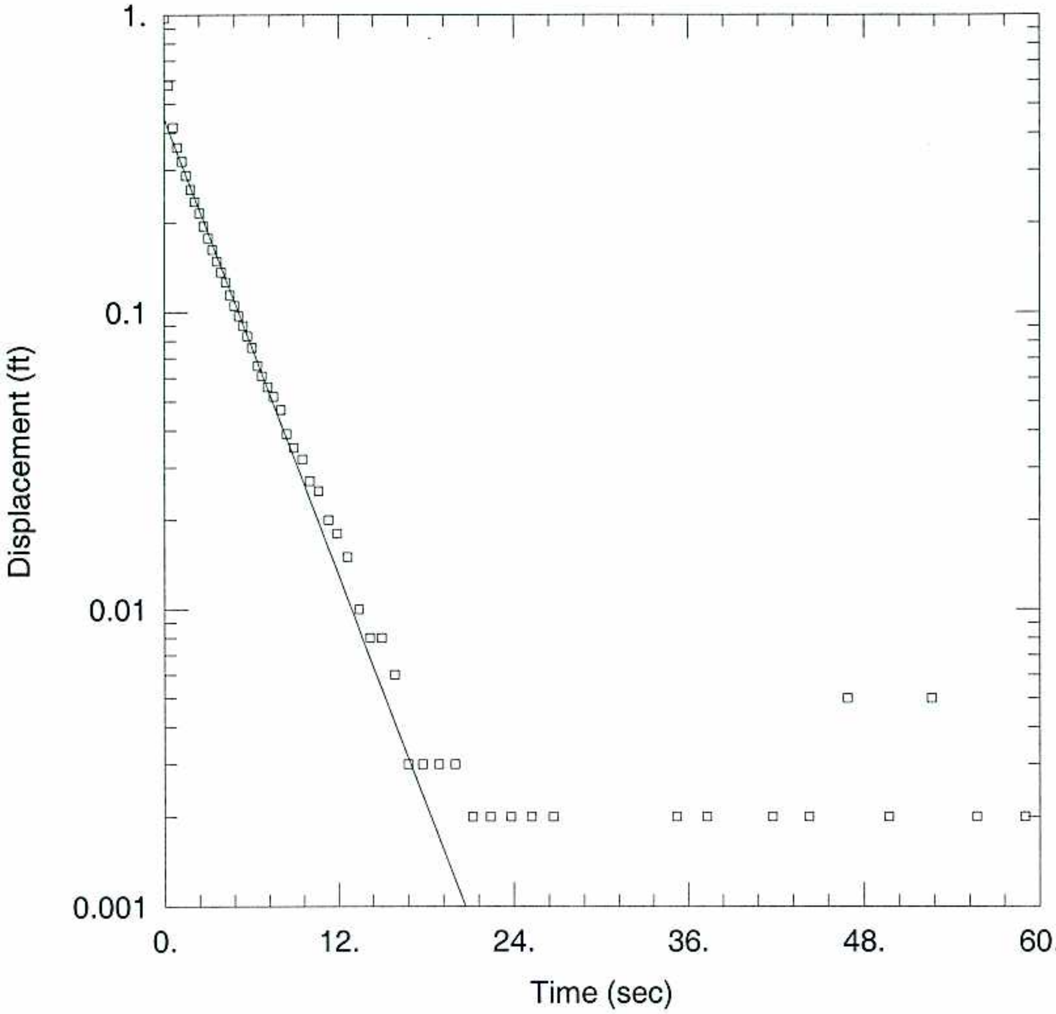
WELL DATA (MW-516D)

Initial Displacement: 2.941 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 22. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.002196 cm/sec
y0 = 1.096 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517S rising.aqt
Date: 10/13/05 Time: 15:56:31

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft
Anisotropy Ratio (Kz/Kr): 1.

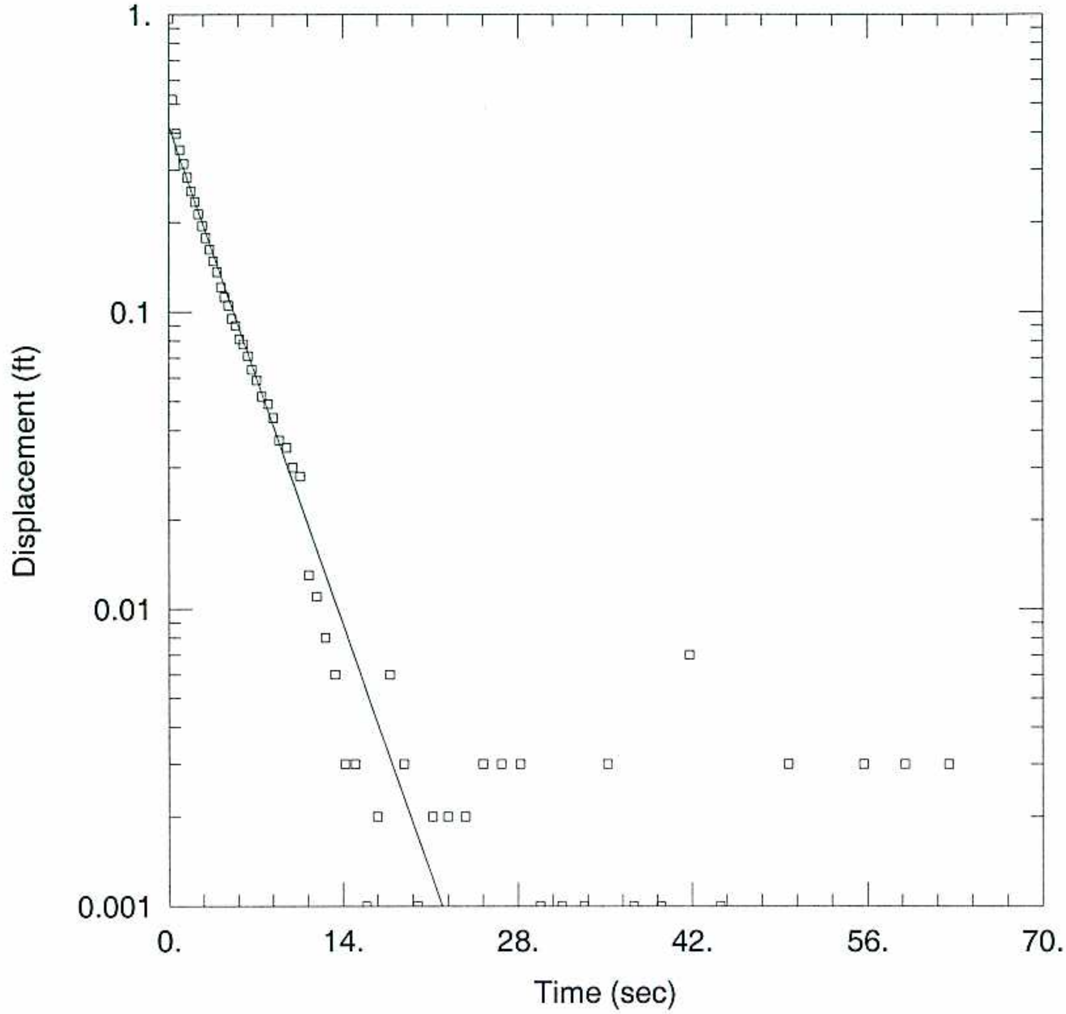
WELL DATA (MW-517S)

Initial Displacement: 0.974 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 6.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01154 cm/sec
y0 = 0.4474 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517S rising2.aqt
Date: 10/13/05 Time: 15:56:26

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517S
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft Anisotropy Ratio (Kz/Kr): 1.

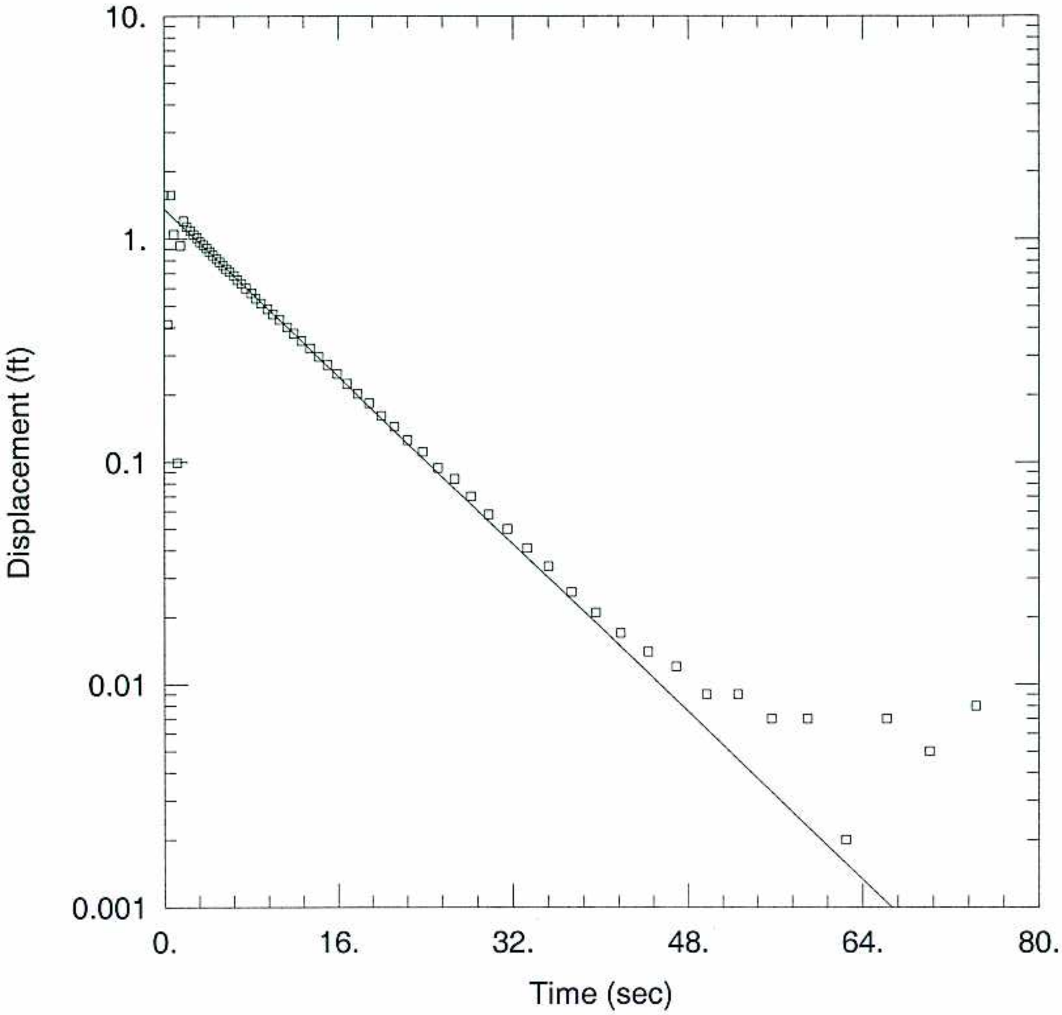
WELL DATA (MW-517S)

Initial Displacement: 0.969 ft Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft Well Skin Radius: 0.333 ft
Screen Length: 5. ft Total Well Penetration Depth: 6.5 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.01077 cm/sec y0 = 0.4196 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517D rising.aqt
Date: 10/13/05 Time: 15:56:21

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft Anisotropy Ratio (Kz/Kr): 1.

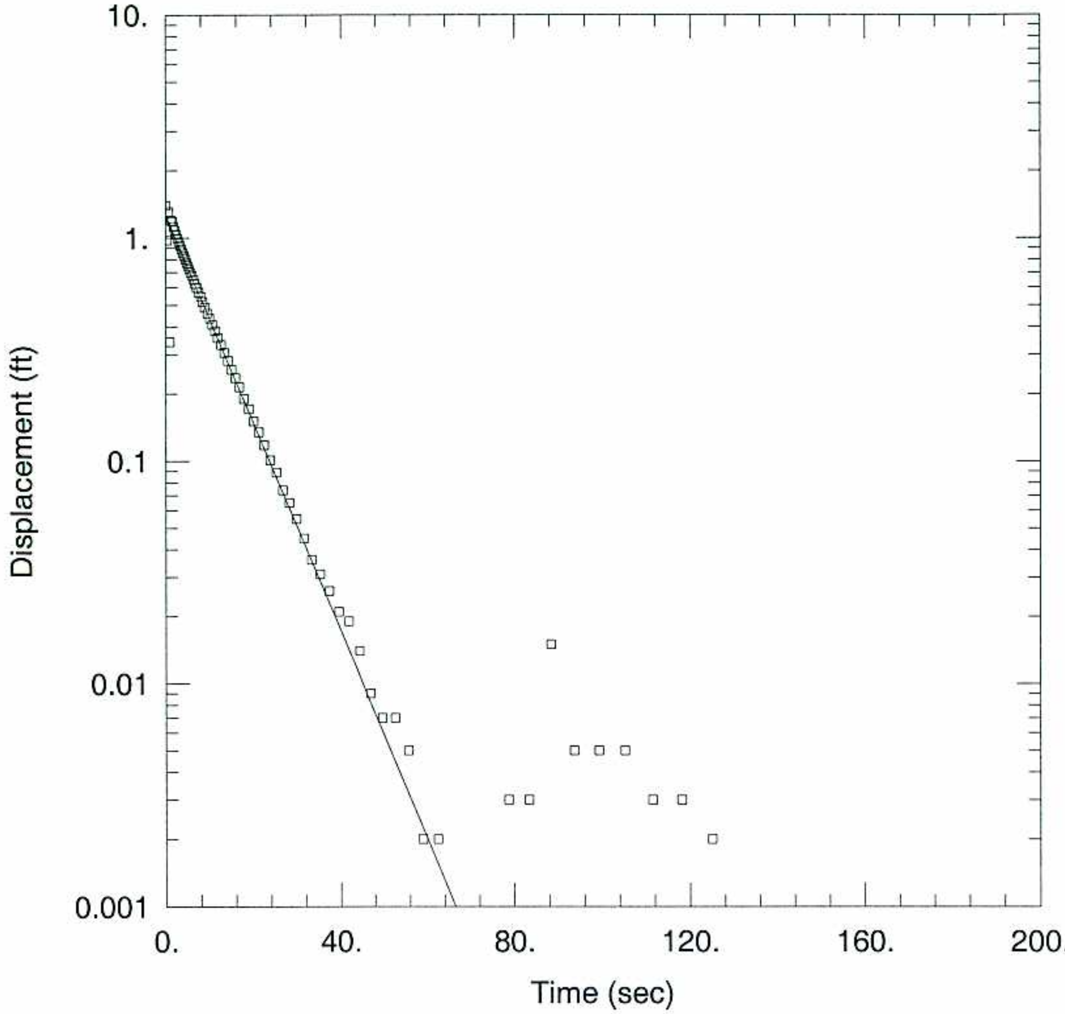
WELL DATA (MW-517D)

Initial Displacement: 1.572 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 19. ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.006582 cm/sec y0 = 1.363 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517D rising2.aqt
Date: 10/13/05 Time: 15:56:08

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft
Anisotropy Ratio (Kz/Kr): 1.

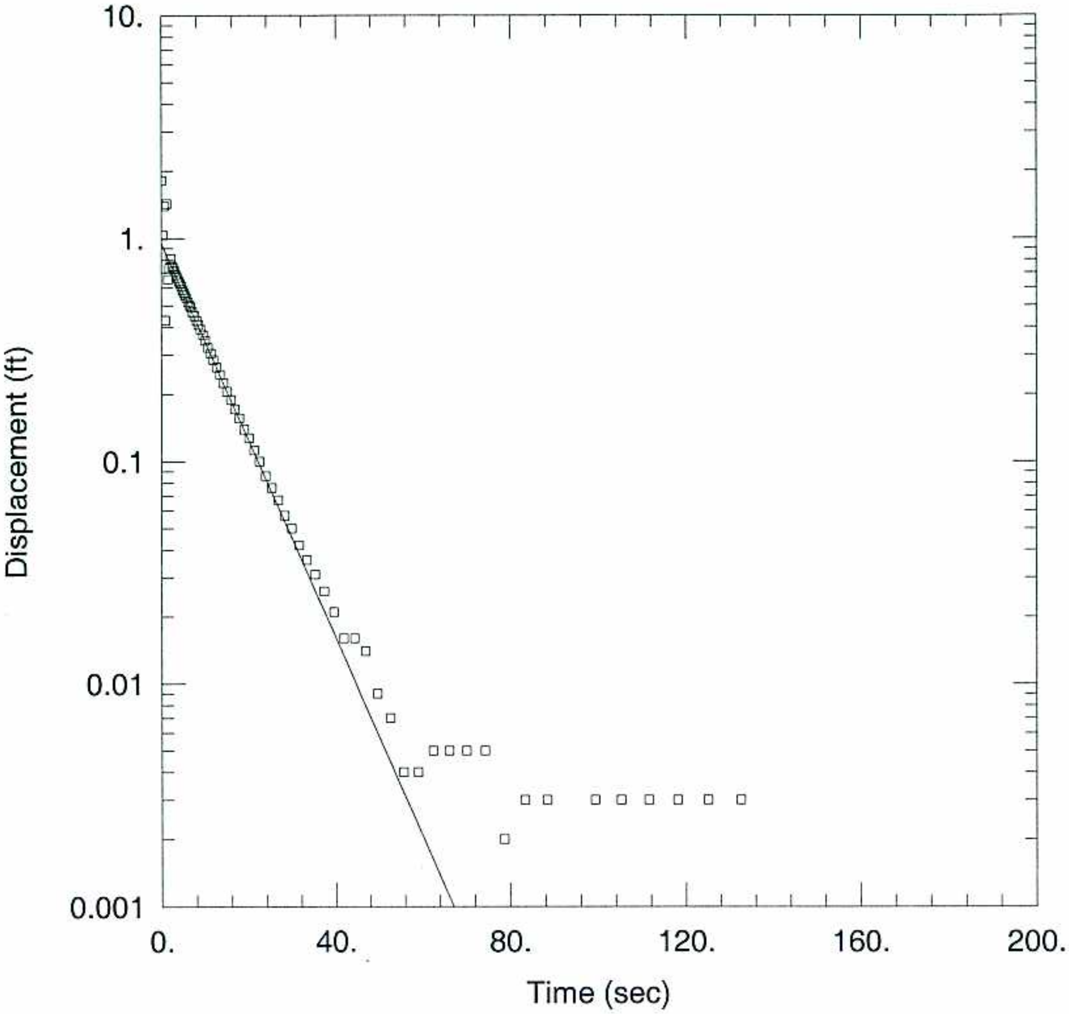
WELL DATA (MW-517D)

Initial Displacement: 1.393 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 19. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.006529 cm/sec
y0 = 1.264 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517D Falling.aqt
Date: 10/13/05 Time: 15:56:00

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft Anisotropy Ratio (Kz/Kr): 1.

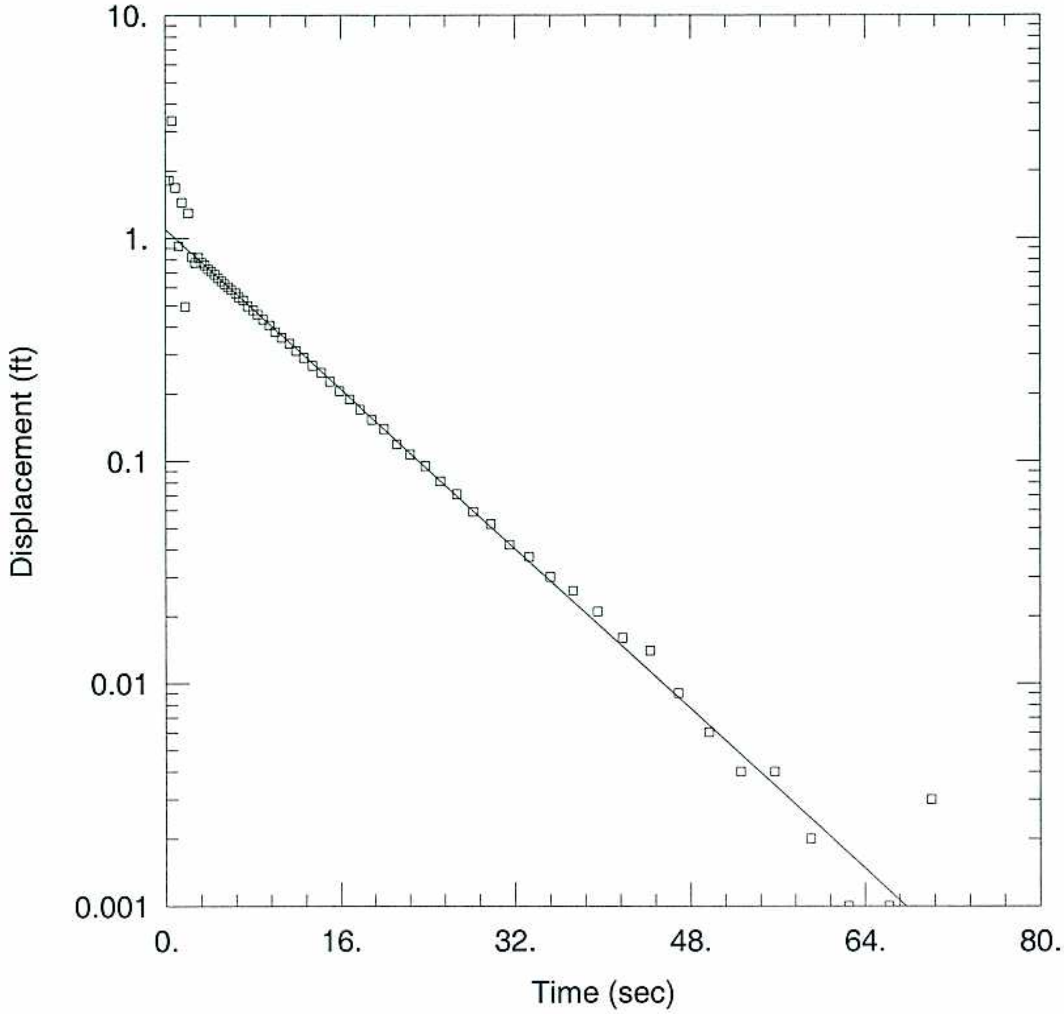
WELL DATA (MW-517D)

Initial Displacement: 1.811 ft
Wellbore Radius: 0.333 ft
Screen Length: 5. ft
Gravel Pack Porosity: 0.25
Casing Radius: 0.08612 ft
Well Skin Radius: 0.333 ft
Total Well Penetration Depth: 19. ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.006201 cm/sec y0 = 0.9471 ft



WELL TEST ANALYSIS

Data Set: \...\MW-517D Falling2.aqt
Date: 10/13/05 Time: 15:55:50

PROJECT INFORMATION

Company: CH2M HILL
Client: USEPA
Project: OMC Plant 2 (OU4) - 186305
Test Location: Waukegan, IL
Test Well: MW-517D
Test Date: 05-09-2005

AQUIFER DATA

Saturated Thickness: 19. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-517D)

Initial Displacement: 1.815 ft
Casing Radius: 0.08612 ft
Wellbore Radius: 0.333 ft
Well Skin Radius: 0.333 ft
Screen Length: 5. ft
Total Well Penetration Depth: 19. ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.006279 cm/sec
y0 = 1.094 ft

Storm Sewer Sediment Investigation
OMC Plant 2 (Operable Unit 4), Waukegan, Illinois
WA No. 237-RICO-0528, Contract No. 68-W6-0025

PREPARED FOR: USEPA

PREPARED BY: CH2M HILL

DATE: March 28, 2006

Introduction

This memorandum documents the activities associated with the storm sewer sediment investigation at the Outboard Marine Corporation Plant 2 (OMC Plant 2) site in Waukegan, Illinois. The investigation activities were conducted on November 21, 2005, to supplement the visual sewer inspections and sewer testing conducted in 2005. This additional investigation included sediment probing and the collection and analysis of saturated sediments from eight storm sewer manholes.

This memorandum includes the following:

- Description of specific field activities performed, including locations and methods
- Summary of the samples collected, requested analyses, and analytical results
- Description of materials encountered at each location

Sediment Investigation

Sediment samples were collected from seven storm sewer locations (Figure 1) located south of OMC Plant 2 and analyzed for polychlorinated biphenyls (PCBs). The objectives of the sediment sampling included:

- Define the thickness of sediment in the storm sewers south the plant
- Determine PCB concentrations in the sediment in the storm sewer manholes
- Evaluate if PCBs in the storm sewer sediments may act as a continuing source of PCBs to Waukegan Harbor and the South Ditch

Sampling Procedures

Following a review of site maps and a visual inspection of the area south of the OMC building, eight storm sewer manhole locations were identified as sample locations. The storm sewer locations were selected for sediment sampling based on proximity to Waukegan Harbor and/or the South Ditch and locations downgradient of areas at the OMC plant, which historically used PCBs in operations.

At each location, the manhole cover was removed and a measuring tape was used to determine the depth from the top of the manhole cover to the top of the water. A steel pole was then used to estimate the depth of the water (distance from the top of the water to the top of the sediments). The sediment thickness was then determined using a hollow steel pipe to collect a sediment core sample.

A stainless-steel hand auger was used to collect sediment samples from two to three locations within each manhole. The sediment samples were placed into a disposable aluminum pan, composited, and the composite sample was placed into an 8-ounce glass jar for laboratory anslysis. The sample collection date, time, and location were noted in the field notebook.

After sample collection was completed, the excess sediments were placed into a 55-gallon drum with the other investigation-derived soil and sediment from remedial investigation activities. The aluminum sampling pans were decontaminated and disposed of with general refuse from the site in a dumpster located onsite. The measuring tape, steel pipe, and stainless-steel hand auger were decontaminated and wrapped in aluminum foil for transport to the next sampling location. The manhole cover was replaced, and the process was repeated at each remaining storm sewer location.

After samples were collected from all of the locations, the chain-of-custody was completed, and the samples were packed on ice in a cooler and shipped to the laboratory to be analyzed for PCBs.

Investigation Findings

Sediment thickness for each storm sewer manhole is summarized in Table 1. Sediment thickness ranged from 4 inches in manholes 1861 and 1913 to 30 inches in manhole 1663. The sediment generally consisted of silty sand with trace organics.

During the sampling activities, a sheen was observed on the water in manholes 1663, 1662, 9, and 7. No odors or free product were observed at any of the storm sewer sampling locations.

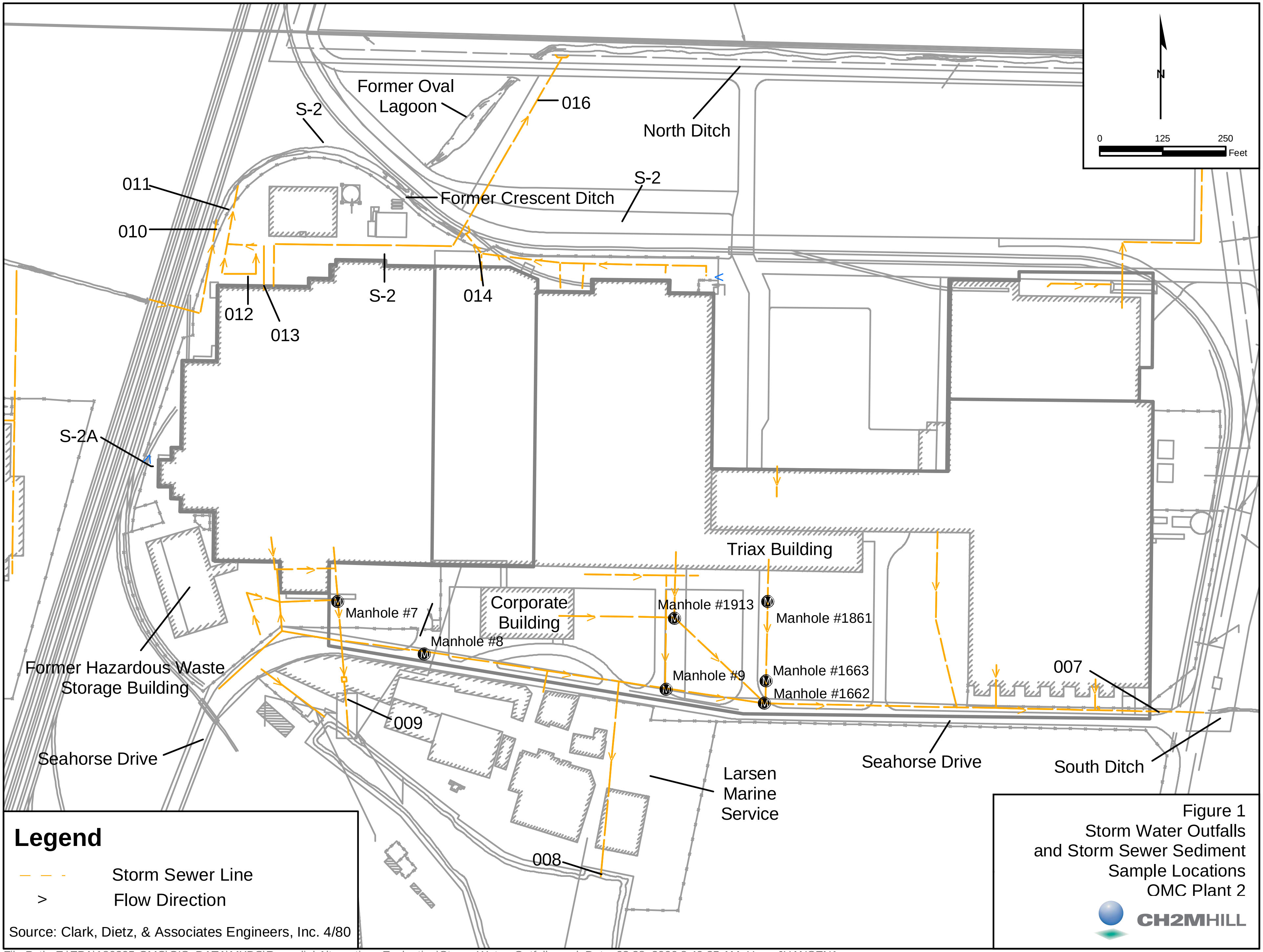
Analytical results are summarized in Table 1. Concentrations of PCBs exceeding 1 milligram per kilogram (mg/kg) were detected in five of the eight samples. The highest PCB concentration was detected in the sample from manhole 1662 (130 mg/kg). Concentrations of PCBs greater than 1 mg/kg were detected in the storm sewer manholes located south of the triax building and just north of East Seahorse Drive. The storm sewer in this area is suspected to discharge to the east into the South Ditch and may extend south beneath the Larsen Marine Service property and discharge to Waukegan Harbor.

The PCB concentrations detected in the sediments and the configuration of the storm sewers indicate that if sediments became suspended, there is a potential for transport of the sediments into the South Ditch and Waukegan Harbor. Further investigation of the storm sewer layout is recommended to confirm the storm sewer discharge points and the sewer integrity.

TABLE 1
Storm Sewer Sediment Sampling Summary
OMC Plant 2 Remedial Investigation

Storm Sewer Manhole ID	Sediment Thickness (inches)	Water Present in Manhole?	Sheen Observed During Sampling?	Total PCBs (mg/kg)
1662	8.0	Yes	Yes	130
1663	30.0	Yes	Yes	3.1
1861	4.0	Yes	No	2.8
1913	4.0	Yes	No	0.9
7	24.0	Yes	Yes	3.0
8	6.0	No	N/A	0.2
9	6.0	Yes	Yes	1.9

Aroclor 1248 was the only PCB aroclor detected in samples.
N/A - not applicable due to absence of water in manhole during sampling.



Legend

Storm Sewer Line

> Flow Direction

Source: Clark, Dietz, & Associates Engineers, Inc. 4/80

Figure 1
Storm Water Outfalls
and Storm Sewer Sediment
Sample Locations
OMC Plant 2

CH2MHILL

File Path: E:\EPA\186305-OMC\GIS_DATA\MXDS\Remedial Alternatives Evaluation\Storm_Water_Outfalls.mxd, Date: 03 28, 2006 8:49:35 AM, User: JHANSEN1

Appendix C
Data Usability Evaluation

Outboard Marine Corporation (OMC), Waukegan, Illinois

Data Quality Evaluation

This memorandum presents the data quality evaluation of the soil and water samples collected during the remedial investigation conducted at the Outboard Marine Corporation (OMC) Site in Waukegan, Illinois from January 2005 through May 2005. Two hundred fifty groundwater samples and one hundred sixty soil samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), dissolved metals, total metals and cyanide, or a subset of these analyses under the contract laboratory program (CLP). All samples were analyzed accoding to CLP SOW *OLM04.3* and CLP SOW *ILM05.3*. In addition, quality assurance/quality control (QA/QC) samples were collected to aid in the assessment of data quality. The QA/QC samples collected were field duplicates, matrix spike/matrix spike duplicates, equipment blanks, and field blanks.

The data were reviewed by the USEPA to assess the accuracy, precision, and completeness using the criteria established in the National Functional Guidelines for Data Review. Data qualifiers were added by the USEPA when the QA/QC data indicated a bias.

Standard data qualifiers were used as a means of classifying the data as to their conformance to QA/QC requirements. The data qualifiers are defined as follows:

[U] The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

[J] The associated value is an estimated quantity. Used when the data indicated the presence of a component was below the stated reporting limit or when the direction of analytical bias was unknown.

[UJ] The component was analyzed for but not detected at a level equal to or greater than the reporting limit. This flag was used when QA/QC data indicated a low bias in the analytical data.

[R] Rejected. The data is of insufficient quality to be deemed acceptable as reported or otherwise qualified.

Groundwater Samples

CH2M HILL conducted a review of the validation performed by the USEPA for the groundwater samples in case numbers 33840, 33893, 33900, 34141, and 34167. The review was based on the validation summary reports provided by the USEPA. One hundred percent of the data were selected for review. **Table 1** lists the case numbers, sample delivery groups (SDGs), and number of samples that were reveiwed.

TABLE 1
Groundwater Sample Summary
OMC – Waukegan, IL

SDG	Case	Number of Samples
E2GZ5	33893	11
E2HB1	33900	11
E2GT1	33840	15
E2HH0	34141	20
E2HN8	34141	8
E2HH6	34141	18
E2GQ8	33840	1
ME2HH0	34141	20
ME2HP5	34141	3
ME2HK5	34141	17
ME2HM1	34141	20
ME2HS7	34167	20
ME2HW5	34167	19
ME2HY6	34167	10
ME2HQ3	34167	19
E2HR2	34167	20
E2HQ3	34167	18

Upon review of the validation case narratives, the validated results show no QC issues affecting the quality and usability of the data. No corrective action by CH2M HILL was deemed necessary or taken; therefore the analytical results, as reported and qualified herein, are of good quality, and may be used to make project decisions.

Soil Samples

CH2M HILL conducted a review of the validation performed by the USEPA for the soil samples in case numbers 33816, 33840, 33893, 33900, 33966, 33985, and 34014. The review was based on the validation summary reports provided by the USEPA. One hundred percent of the data were selected for review. **Table 2** lists the case numbers, sample delivery groups (SDGs), and number of samples that were reveiwed.

TABLE 2
Soil Sample Summary
OMC – Waukegan, IL

SDG	Case	Number of Samples
E2HC7	33966	9
E2HB0	33900	4
E2GS8	33840	7
E2GZ0	33840	5
E2GQ8	33840	20
E2GX0	33840	20
E2GN8	33840	20
E2GZ8	33893	4
E2GK0	33816	19
E2GL8	33816	19
E2HF6	33985	3
E2HD6	33985	20
E2HF9	34014	11

Upon review of the validation case narratives, CH2M HILL observed the validated results show no QC issues affecting the quality and usability of the data. No corrective action by CH2M HILL was deemed necessary or taken; therefore the analytical results, as reported and qualified herein, are of good quality, and may be used to make project decisions.

In addition, CH2M HILL conducted a review between the electronic results and the corresponding validation reports submitted by USEPA. Approximately 10 percent of the data submitted was subject to a review. No issues were found affecting the data reported, therfore no corrective action was deemed ncecesary.

Conclusions

All of the validation reports reviewed were found to fall within the applicable National Functional Guidelines for Data Review. Therefore it is deemed that the validation performed by the USEPA is correct and complete for those samples analyzed by the CLP. Completeness of the analytical data was assessed for compliance with the amount of data required for decision making. The completeness goal for the project data is 100 percent. Qualified data, if not rejected, can still be used to make project decisions and is considered to be compliant data. The percent completeness for the sediment data was 100 percent. Thus the data completeness goal stated in Quality Assurance Project Plan (CH2M HILL, December 2004) was met for this sampling event.

Data Summary Tables

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-001	NPW-002	NPW-003	NPW-004	NPW-005	NPW-006	NPW-007	NPW-008
	Sample:	05CK08-01	05CK08-02	05CK08-03	05CK08-04	05CK08-05	05CK08-06	05CK08-07	05CK08-08
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	100	63	64	120	160	28	100	84
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-009	NPW-010	NPW-011	NPW-012	NPW-013	NPW-014	NPW-015	NPW-016
	Sample:	05CK08-09	05CK08-10	05CK08-25	05CK08-26	05CK08-27	05CK08-28	05CK08-29	05CK08-30
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/14/2004	12/14/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	60	350	15	70	98	120	27	540
PCB-1248 (AROCHLOR 1248)	µg/kg								

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-017	NPW-018	NPW-019	NPW-020	NPW-021	NPW-022	NPW-023	NPW-024
	Sample:	05CK08-31	05CK08-32	05CK08-41	05CK08-49	05CK08-42	05CK08-43	05CK08-50	05CK08-51
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	200	76	3.9	7.5	30	11	150	16
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-025	NPW-026	NPW-027	NPW-028	NPW-030	NPW-031	NPW-032	NPW-033
	Sample:	05CK08-52	05CK08-53	05CK08-54	05CK08-55	05CK08-57	05CK08-58	05CK08-59	05CK08-60
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	91	110	430	220	87	65	46	210
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-034	NPW-035	NPW-036	NPW-037	NPW-038	NPW-039	NPW-039	NPW-040
	Sample:	05CK08-76	05CK08-77	05CK08-78	05CK08-79	05CK08-80	05CK08-81	05CK08-82	05CK08-83
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe, dup	Wipe
	Date:	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	96	120	90	130	140	180	190	210
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-041	NPW-042	NPW-043	NPW-044	NPW-045	NPW-046	NPW-047	NPW-048
	Sample:	05CK08-84	05CK08-85	05CK08-86	05CK08-92	05CK08-93	05CK08-94	05CK08-95	05CK08-96
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	230	150	100	91	70	40	90	600
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-062	NPW-063	NPW-064	NPW-065	NPW-066	NPW-066	NPW-067	NPW-068
	Sample:	05CK28-28	05CK28-29	05CK28-30	05CK28-31	05CK28-32	05CK28-33	05CK28-34	05CK28-35
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe, dup	Wipe	Wipe	Wipe
	Date:	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	26	6.8	10 J	15	19 J	32	34	85
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-069	NPW-070	NPW-071	NPW-072	NPW-073	NPW-074	NPW-075	NPW-076
	Sample:	05CK28-36	05CK28-37	05CK28-38	05CK28-39	05CK28-40	05CK28-41	05CK28-42	05CK28-43
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	77	67	1.4 J	17	4.9 J	8.5 J	14	1.3
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	NPW-077	NPW-078	NPW-078	NPW-079	NPW-080	PW-001	PW-003	PW-004
	Sample:	05CK28-44	05CK28-45	05CK28-46	05CK28-47	05CK28-48	05CK08-97	05CK08-99	05CK09-01
	Matrix:	Wipe	Wipe	Wipe, dup	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	4/6/2005	4/6/2005	4/6/2005	4/6/2005	4/6/2005	12/16/2004	12/16/2004	12/16/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	16	0.71	2.3	1.9 J	1.1	0.46	0.91	2.4
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-005	PW-005	PW-007	PW-008	PW-009	PW-014	PW-015	PW-015
	Sample:	05CK09-02	05CK09-03	05CK09-19	05CK09-04	05CK09-09	05CK09-13	05CK08-34	05CK28-49
	Matrix:	Wipe	Wipe, dup	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/15/2004	4/7/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	1.1	1.2	0.33	2.3	4.7	0.67	47	
PCB-1248 (AROCHLOR 1248)	µg/kg								190,000

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-016	PW-017	PW-017	PW-018	PW-020	PW-020	PW-021	PW-022
	Sample:	05CK09-14	05CK09-15	05CK09-16	05CK09-17	05CK08-36	05CK28-50	05CK08-37	05CK08-38
	Matrix:	Wipe	Wipe	Wipe, dup	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/15/2004	4/7/2005	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	2.2	5.8	5.5	13	750		23	15
PCB-1248 (AROCHLOR 1248)	µg/kg						99,000		

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-023	PW-023	PW-023	PW-024	PW-025	PW-025	PW-026	PW-027
	Sample:	05CK08-61	05CK08-62	05CK28-51	05CK08-39	05CK09-05	05CK28-52	05CK28-53	05CK08-14
	Matrix:	Wipe	Wipe, dup	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/15/2004	12/15/2004	4/7/2005	12/15/2004	12/16/2004	4/7/2005	4/7/2005	12/14/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	250	340		27	710			2.2
PCB-1248 (AROCHLOR 1248)	µg/kg			730,000			13,000	11,000	

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

		PW-028	PW-029	PW-030	PW-031	PW-033	PW-034	PW-035	PW-036
	Station:	PW-028	PW-029	PW-030	PW-031	PW-033	PW-034	PW-035	PW-036
	Sample:	05CK08-15	05CK08-16	05CK08-17	05CK08-18	05CK08-20	05CK08-21	05CK08-22	05CK08-23
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004	12/14/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	4.6	1.7	4.6	42	1.9	9.4	32	12
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-037	PW-038	PW-039	PW-040	PW-041	PW-041	PW-042	PW-042
	Sample:	05CK08-63	05CK08-64	05CK08-44	05CK08-45	05CK08-46	05CK28-54	05CK08-65	05CK08-66
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe, dup
	Date:	12/15/2004	12/15/2004	12/15/2004	12/15/2004	12/15/2004	4/7/2005	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	14	4.1	9.4	5.5	150		140	250
PCB-1248 (AROCHLOR 1248)	µg/kg						600,000		

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-042	PW-043	PW-043	PW-044	PW-045	PW-046	PW-047	PW-048
	Sample:	05CK28-55	05CK08-67	05CK28-56	05CK08-68	05CK08-69	05CK08-70	05CK08-24	05CK08-71
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	4/7/2005	12/15/2004	4/7/2005	12/15/2004	12/15/2004	12/15/2004	12/14/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2		98		33	0.97	18	19	13
PCB-1248 (AROCHLOR 1248)	µg/kg	190,000		92,000 J					

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-049	PW-050	PW-051	PW-052	PW-053	PW-054	PW-055	PW-056
	Sample:	05CK09-18	05CK08-87	05CK08-88	05CK08-89	05CK08-90	05CK08-72	05CK08-73	05CK08-74
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe	Wipe
	Date:	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/16/2004	12/15/2004	12/15/2004	12/15/2004
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	15	2.8	0.69	18	53	3.6	1.7	5.2
PCB-1248 (AROCHLOR 1248)	µg/kg								

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-1
Appendix C
OMC Nonporous and Porous Wipe Samples
PCBs

	Station:	PW-057	PW-058	PW-059	PW-059	PW-059	PW-060	PW-061	PW-061
	Sample:	05CK08-91	05CK09-06	05CK08-75	05CK28-57	05CK28-58	05CK08-47	05CK08-48	05CK28-59
	Matrix:	Wipe	Wipe	Wipe	Wipe	Wipe, dup	Wipe	Wipe	Wipe
	Date:	12/16/2004	12/16/2004	12/15/2004	4/7/2005	4/7/2005	12/15/2004	12/15/2004	4/7/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/100cm^2	11	5.7	200			14	170	
PCB-1248 (AROCHLOR 1248)	µg/kg				64,000	110,000			810,000

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-2
Appendix C
OMC Concrete
Metals

	Station:	CB-008	CB-011	CB-013	CB-014	CB-014	CB-015
	Sample:	05CK12-11	05CK12-13	05CK12-22	05CK12-15	05CK12-23	05CK12-14
	Interval:	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
	Matrix:	Concrete	Concrete	Concrete	Concrete	Concrete, dup	Concrete
	Date:	1/18/2005	1/18/2005	1/19/2005	1/18/2005	1/19/2005	1/18/2005
Metals							
ALUMINUM (FUME OR DUST)	µg/kg	5,140,000	6,820,000	6,000,000	7,970,000	7,250,000	8,990,000
ARSENIC	ug/Kg	1,900 J	3,300 J	3,300 J	4,200	3,100 J	10,400
BARIUM	µg/kg	31,700	169,000	56,900	57,000	36,600	66,100
BERYLLIUM	µg/kg	270	200 J	160 J	380	370 J	510
CADMIUM	µg/kg	230 J	790	250 J	660	470 U	1300
CALCIUM METAL	µg/kg	165,000,000	151,000,000	148,000,000	186,000,000	155,000,000	175,000,000
CHROMIUM, TOTAL	µg/kg	6,200	10,500	10,800	15,900	16,600	105,000
COBALT	µg/kg	9,700	3,100	3,000	4,300	10,300	6,200
COPPER	µg/kg	13,000	26,200	17,100	25,100	39,300	236,000
CYANIDE	µg/kg	2,300	310 U	310 U	310 U	310 U	310 U
IRON	µg/kg	5,780,000	6,660,000	7,220,000	10,900,000	10,500,000	59,900,000
LEAD	µg/kg	3,700 J	5,200	4,100 J	4,600	4,200 J	5,400
MAGNESIUM	µg/kg	47,600,000	42,800,000	43,100,000	43,300,000	42,400,000	41,600,000
MANGANESE	µg/kg	209,000	191,000	224,000	616,000	440,000	1,260,000
NICKEL	µg/kg	3,200	9,300	4,300	7,900	11,300	39,800
POTASSIUM	µg/kg	1,660,000	1,560,000	1,880,000	1,640,000	1,500,000	1,170,000
SILVER	µg/kg	690 U	680 U	660 U	660 U	6800 U	1,900 J
SODIUM	µg/kg	499,000 J	714,000	263,000 J	466,000 J	292,000 J	490,000 J
VANADIUM (FUME OR DUST)	µg/kg	10,000	23,400	14,000	13,200	14,600	15,000
ZINC	µg/kg	19,900	41,200	45,400	32,800	23,200	31,500

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-3
Appendix C
OMC Concrete
PCBs

	Station:	CB-001	CB-001	CB-002	CB-003	CB-004	CB-005	CB-006	CB-007	CB-008
	Sample:	05CK12-17	05CK12-18	05CK12-06	05CK12-08	05CK12-09	05CK12-10	05CK12-19	05CK12-20	05CK12-11
	Interval:	0 - 0.3	0.3 - 0.6	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
	Matrix:	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
	Date:	1/19/2005	1/19/2005	1/18/2005	1/18/2005	1/18/2005	1/18/2005	1/19/2005	1/19/2005	1/18/2005
PCBs										
PCB-1248 (AROCHLOR 1248)	µg/kg	54,000 J	520,000 J	22,000 J	35,000 J	11,000 J	22,000 J	640	6,500 J	1,000 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-3
Appendix C
OMC Concrete
PCBs

	Station:	CB-009	CB-010	CB-010	CB-011	CB-012	CB-013	CB-014	CB-014
	Sample:	05CK12-12	05CK12-01	05CK12-21	05CK12-13	05CK12-02	05CK12-22	05CK12-15	05CK12-23
	Interval:	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
	Matrix:	Concrete	Concrete	Concrete, dup	Concrete	Concrete	Concrete	Concrete	Concrete, dup
	Date:	1/18/2005	1/17/2005	1/19/2005	1/18/2005	1/17/2005	1/19/2005	1/18/2005	1/19/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/kg	1,400,000 J	2,700	1,200 J	310 J	9,200 J	1,400 J	240,000 J	380,000 J

Table 1-3
Appendix C
OMC Concrete
PCBs

		CB-015	CB-017	CB-018	CB-019	CB-020	CB-021	CB-021	CB-022
	Station:	CB-015	CB-017	CB-018	CB-019	CB-020	CB-021	CB-021	CB-022
	Sample:	05CK12-14	05CK12-03	05CK12-24	05CK12-05	05CK12-04	05CK12-25	05CK12-26	05CK12-16
	Interval:	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0.4 - 0.7	0 - 0.3
	Matrix:	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete	Concrete
	Date:	1/18/2005	1/17/2005	1/19/2005	1/18/2005	1/17/2005	1/19/2005	1/19/2005	1/18/2005
PCBs									
PCB-1248 (AROCHLOR 1248)	µg/kg	19,000 J	13,000	2,100,000 J	810	5,000	6,600 J	280,000 J	970,000 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 1-4
Appendix C
OMC Concrete
SPLP Metals

	Station:	CB-008	CB-011	CB-013	CB-014	CB-014	CB-015
	Sample:	05CK12-11	05CK12-13	05CK12-22	05CK12-15	05CK12-23	05CK12-14
	Interval:	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3	0 - 0.3
	Matrix:	Concrete	Concrete	Concrete	Concrete	Concrete, dup	Concrete
	Date:	1/18/2005	1/18/2005	1/19/2005	1/18/2005	1/19/2005	1/18/2005
SPLP Metals							
ALUMINUM (FUME OR DUST)	µg/L	740 J	600 U	600 U	600 U	600 U	720 J
BARIUM	µg/L	94	780	72	210	160	270
CALCIUM METAL	µg/L	240,000	360,000	520,000	430,000	480,000	470,000
CHROMIUM, TOTAL	µg/L	2.7 U	21	16	4.6 J	9.5 J	2.7 U
COPPER	µg/L	20 J	32	43	38	44	42
IRON	µg/L	29 U	29 U	29 U	29 U	320 J	240 J
LEAD	µg/L	0.15 U	0.15 U	0.15 U	0.15 U	0.48 J	0.41 J
MAGNESIUM	µg/L	50 U	50 U	50 U	50 U	680 J	460 J
MANGANESE	µg/L	5.7 U	5.7 U	5.7 U	5.7 U	12 J	23
POTASSIUM	µg/L	20,000	25,000	33,000	22,000	1,200 U	13,000
SODIUM	µg/L	8,900	16,000	4,800	14,000	1,400 U	10,000

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-001	SO-001	SO-002	SO-002	SO-003	SO-003	SO-005	SO-007
	Sample:	E2GM4	E2GM5	E2GM6	E2GM7	E2GK0	E2GK1	E2GN7	E2GP0
	Interval:	0 - 0.5	0.7 - 1.6	0 - 0.5	0.5 - 1.3	0 - 0.5	1.5 - 2	2 - 2.5	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/2/2005	2/2/2005	2/2/2005	2/2/2005	1/31/2005	1/31/2005	2/2/2005	2/7/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	13 U	10 U	16 U	13 U	10 UJ	10 UJ	10 U	10 U
1,1-DICHLOROETHANE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	13 UJ	10 UJ	16 UJ	13 UJ	10 UJ	10 UJ	10 UJ	10 U
1,2,4-TRICHLOROBENZENE	µg/kg	13 UJ	10 UJ	16 UJ	13 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2-DICHLOROBENZENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	2 J
1,3-DICHLOROBENZENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 UJ
1,4-DICHLOROBENZENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 UJ
2-BUTANONE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
2-HEXANONE	µg/kg	13 U	10 U	16 U	13 U	10 UJ	10 UJ	10 U	10 UJ
ACETONE	µg/kg	36	29	13 J	20	10 U	10 U	15 J	10 U
BENZENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CARBON TETRACHLORIDE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CHLOROETHANE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CHLOROFORM	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
CYCLOHEXANE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	µg/kg	13 U	28	16 U	13 U	10 U	10 U	10 U	10 UJ
ISOPROPYLBENZENE (CUMENE)	µg/kg	13 U	4 J	16 U	13 U	10 U	10 U	10 U	10 UJ
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 UJ
METHYLCYCLOHEXANE	µg/kg	13 U	4 J	16 U	13 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	µg/kg	13 U	10 U	16 U	13 U	5 J	4 J	10 U	10 U
TETRACHLOROETHYLENE(PCE)	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 UJ
TOLUENE	µg/kg	13 U	20	16 U	13 U	10 U	10 U	10 U	10 UJ
TRANS-1,2-DICHLOROETHENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
TRICHLOROETHYLENE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
VINYL CHLORIDE	µg/kg	13 U	10 U	16 U	13 U	10 U	10 U	10 U	10 U
XYLENES, TOTAL	µg/kg	13 U	73	16 U	13 U	10 U	10 U	10 U	10 UJ

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-007	SO-008	SO-008	SO-009	SO-010	SO-010	SO-011	SO-012
	Sample:	E2GP1	E2GK2	E2GK3	E2GK5	E2GK6	E2GK7	E2GP3	E2GP4
	Interval:	0.7 - 1.4	0 - 0.5	1.5 - 2.5	1.5 - 2.5	0 - 0.5	1.5 - 2.5	1.2 - 1.9	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/7/2005	1/31/2005	1/31/2005	1/31/2005	1/31/2005	1/31/2005	2/7/2005	2/7/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	10 U	10 UJ	10 UJ	10 U	10 U	13 U	10 U	11 U
1,1-DICHLOROETHANE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
1,1-DICHLOROETHYLENE	µg/kg	10 U	10 UJ	10 UJ	10 U	10 U	13 U	10 U	11 U
1,2,4-TRICHLOROBENZENE	µg/kg	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	13 UJ	10 UJ	11 UJ
1,2-DICHLOROBENZENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
1,3-DICHLOROBENZENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
1,4-DICHLOROBENZENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
2-BUTANONE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
2-HEXANONE	µg/kg	10 U	10 UJ	10 UJ	10 U	10 U	13 U	10 U	11 U
ACETONE	µg/kg	10 U	15 U	10 U	14 U	16 U	30 U	10 U	11 U
BENZENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
CARBON DISULFIDE	µg/kg	2 J	10 U	10 U	10 U	10 U	13 U	3 J	2 J
CARBON TETRACHLORIDE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
CHLOROETHANE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
CHLOROFORM	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
CIS-1,3-DICHLOROPROPENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
CYCLOHEXANE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
ETHYLBENZENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
METHYLCYCLOHEXANE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
METHYLENE CHLORIDE	µg/kg	10 U	4 J	3 J	3 J	3 J	4 J	10 U	11 U
TETRACHLOROETHYLENE(PCE)	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
TOLUENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
TRANS-1,2-DICHLOROETHENE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
TRICHLOROETHYLENE	µg/kg	10 U	36	10 U	10 U	10 U	13 U	10 U	11 U
VINYL CHLORIDE	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U
XYLENES, TOTAL	µg/kg	10 U	10 U	10 U	10 U	10 U	13 U	10 U	11 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-012	SO-013	SO-013	SO-014	SO-014	SO-014	SO-015	SO-015
	Sample:	E2GP5	E2GP6	E2GP7	E2GX0	E2GX1	E2GX2	E2GR8	E2GR9
	Interval:	1.6 - 2.6	0 - 0.5	1.4 - 1.9	0 - 0.5	1.5 - 2	1.5 - 2	0.3 - 0.8	0.8 - 1.2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil
	Date:	2/7/2005	2/7/2005	2/7/2005	2/17/2005	2/17/2005	2/17/2005	2/9/2005	2/9/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
1,1-DICHLOROETHANE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 UJ	10 UJ
1,2,4-TRICHLOROBENZENE	µg/kg	10 UJ	11 UJ	11 UJ	29	10 U	2 J	12 U	10 U
1,2-DICHLOROBENZENE	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
1,3-DICHLOROBENZENE	µg/kg	10 U	11 UJ	11 U	6 J	3 J	6 J	12 U	10 U
1,4-DICHLOROBENZENE	µg/kg	10 U	11 UJ	11 U	3 J	2 J	2 J	12 U	10 U
2-BUTANONE	µg/kg	10 U	11 U	11 U	10 U	10 U	3 J	12 UJ	10 UJ
2-HEXANONE	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
ACETONE	µg/kg	10 U	11 U	11 U	15 U	14 U	10 U	12 UJ	10 UJ
BENZENE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
CARBON DISULFIDE	µg/kg	3 J	2 J	2 J	10 U	3 J	10 U	12 U	10 U
CARBON TETRACHLORIDE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
CHLOROETHANE	µg/kg	10 U	11 U	11 U	10 UJ	10 UJ	4 J	12 U	10 U
CHLOROFORM	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
CYCLOHEXANE	µg/kg	10 U	7 J	11 U	3 J	10 U	10 U	12 U	10 U
ETHYLBENZENE	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	10 U	11 UJ	11 U	10 U	8 J	14	12 U	10 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
METHYLCYCLOHEXANE	µg/kg	10 U	44	11 U	10 U	10 U	10 U	12 U	10 U
METHYLENE CHLORIDE	µg/kg	10 U	11 U	11 U	10 U	3 J	10 U	12 U	10 U
TETRACHLOROETHYLENE(PCE)	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
TOLUENE	µg/kg	10 U	11 UJ	11 U	10 U	10 U	10 U	12 U	10 U
TRANS-1,2-DICHLOROETHENE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
TRICHLOROETHYLENE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	10 J	15
VINYL CHLORIDE	µg/kg	10 U	11 U	11 U	10 U	10 U	10 U	12 U	10 U
XYLENES, TOTAL	µg/kg	10 U	9 J	11 U	10 U	4 J	3 J	12 U	10 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-016	SO-016	SO-017	SO-017	SO-018	SO-019	SO-019	SO-020
	Sample:	E2GX3	E2GX4	E2GX5	E2GX6	E2GX7	E2GX9	E2GY0	E2GK8
	Interval:	0 - 0.5	1.5 - 2	0 - 0.5	1.4 - 2	0 - 0.5	0 - 0.5	1.5 - 2.5	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/1/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	16 U	37	10 U	10 U	11 U	10 U	12 U	11 U
1,1-DICHLOROETHANE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
1,1-DICHLOROETHYLENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
1,2,4-TRICHLOROBENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 UJ
1,2-DICHLOROBENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
1,3-DICHLOROBENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
1,4-DICHLOROBENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
2-BUTANONE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
2-HEXANONE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
ACETONE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	12 U
BENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
CARBON DISULFIDE	µg/kg	6 J	10 U	10 U	10 U	11 U	10 U	12 U	11 U
CARBON TETRACHLORIDE	µg/kg	16 U	6 J	10 U	10 U	11 U	10 U	12 U	11 U
CHLOROETHANE	µg/kg	16 UJ	10 UJ	10 UJ	10 UJ	11 UJ	10 UJ	12 UJ	11 U
CHLOROFORM	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
CIS-1,3-DICHLOROPROPENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
CYCLOHEXANE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
ETHYLBENZENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	6 J	10 U	10 U	10 U	11 U	10 U	12 U	11 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
METHYLCYCLOHEXANE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
METHYLENE CHLORIDE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
TETRACHLOROETHYLENE(PCE)	µg/kg	16 U	140	10 U	10 U	11 U	10 U	12 U	11 U
TOLUENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
TRANS-1,2-DICHLOROETHENE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
TRICHLOROETHYLENE	µg/kg	16 U	35	2 J	440	3 J	3 J	6 J	160
VINYL CHLORIDE	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U
XYLENES, TOTAL	µg/kg	16 U	10 U	10 U	10 U	11 U	10 U	12 U	11 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-020	SO-023	SO-024	SO-024	SO-026	SO-026	SO-026	SO-027
	Sample:	E2GK9	E2GL5	E2GL6	E2GL7	E2GP8	E2GP9	E2GQ0	E2GL8
	Interval:	0.5 - 1.5	1.5 - 2.5	0 - 0.5	1.5 - 2.5	0 - 0.5	1 - 2	1 - 2	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil
	Date:	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/7/2005	2/7/2005	2/7/2005	2/1/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 UJ
1,1-DICHLOROETHANE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	10 U	12 UJ	16 UJ	11 UJ	10 U	10 U	10 U	10 UJ
1,2,4-TRICHLOROBENZENE	µg/kg	10 UJ	12 UJ	16 UJ	11 UJ	10 UJ	10 UJ	10 UJ	10 UJ
1,2-DICHLOROBENZENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
1,3-DICHLOROBENZENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
1,4-DICHLOROBENZENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
2-BUTANONE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
2-HEXANONE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 UJ
ACETONE	µg/kg	10 U	10 J	54 J	23 J	10 U	10 U	10 U	10 U
BENZENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
CARBON DISULFIDE	µg/kg	10 U	12 U	16 U	11 U	2 J	2 J	2 J	10 U
CARBON TETRACHLORIDE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
CHLOROETHANE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
CHLOROFORM	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
CYCLOHEXANE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
ETHYLBENZENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
METHYLCYCLOHEXANE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
METHYLENE CHLORIDE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	4 J
TETRACHLOROETHYLENE(PCE)	µg/kg	10 U	12	16 U	11 U	10 U	10 U	10 U	10 U
TOLUENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
TRANS-1,2-DICHLOROETHENE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
TRICHLOROETHYLENE	µg/kg	630	12 U	11 J	11 U	15	160	110	10 U
VINYL CHLORIDE	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U
XYLENES, TOTAL	µg/kg	10 U	12 U	16 U	11 U	10 U	10 U	10 U	10 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-027	SO-028	SO-028	SO-029	SO-029	SO-030	SO-031	SO-031
	Sample:	E2GL9	E2GM0	E2GM1	E2GM2	E2GM3	E2GY1	E2GQ1	E2GQ2
	Interval:	1 - 2	0 - 0.5	1.5 - 2.5	0 - 0.5	1.5 - 2.5	0 - 0.5	0 - 0.5	1.5 - 2.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/17/2005	2/7/2005	2/7/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	14 UJ	13 UJ	14 UJ	12 UJ	10 UJ	13 U	10 U	11 U
1,1-DICHLOROETHANE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
1,1-DICHLOROETHYLENE	µg/kg	14 UJ	13 UJ	14 UJ	12 UJ	10 UJ	13 U	10 U	11 U
1,2,4-TRICHLOROBENZENE	µg/kg	14 UJ	13 UJ	14 UJ	12 UJ	10 UJ	13 U	10 UJ	11 UJ
1,2-DICHLOROBENZENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
1,3-DICHLOROBENZENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
1,4-DICHLOROBENZENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
2-BUTANONE	µg/kg	14 U	13 U	14 U	12 U	3 J	13 U	10 U	11 U
2-HEXANONE	µg/kg	14 UJ	13 UJ	14 UJ	12 UJ	10 UJ	13 U	10 U	11 U
ACETONE	µg/kg	14 U	13 U	14 U	12 U	17 U	13 U	10 U	11 U
BENZENE	µg/kg	14 U	13 U	14 U	12 U	10 U	15	10 U	11 U
CARBON DISULFIDE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	3 J	2 J
CARBON TETRACHLORIDE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
CHLOROETHANE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 UJ	10 U	11 U
CHLOROFORM	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
CIS-1,3-DICHLOROPROPENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
CYCLOHEXANE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
ETHYLBENZENE	µg/kg	14 UJ	13 U	14 U	12 U	10 U	13 U	10 U	11 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
METHYLCYCLOHEXANE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
METHYLENE CHLORIDE	µg/kg	11 J	5 J	7 J	6 J	3 J	6 J	10 U	11 U
TETRACHLOROETHYLENE(PCE)	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
TOLUENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
TRANS-1,2-DICHLOROETHENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
TRICHLOROETHYLENE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
VINYL CHLORIDE	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U
XYLENES, TOTAL	µg/kg	14 U	13 U	14 U	12 U	10 U	13 U	10 U	11 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-033	SO-033	SO-035	SO-035	SO-036	SO-038	SO-040	SO-043
	Sample:	E2GS7	E2GS8	E2GQ3	E2GQ4	E2GQ5	E2GQ7	E2GR1	E2GS3
	Interval:	0 - 0.5	2.4 - 2.6	0 - 0.5	1 - 2	0 - 0.5	0 - 0.5	0 - 0.5	2.8 - 3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/9/2005	2/9/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/9/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
1,1-DICHLOROETHANE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
1,1-DICHLOROETHYLENE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
1,2,4-TRICHLOROBENZENE	µg/kg	11 U	10 UJ	12 UJ	11 UJ	14 U	10 U	11 U	12 U
1,2-DICHLOROBENZENE	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
1,3-DICHLOROBENZENE	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
1,4-DICHLOROBENZENE	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
2-BUTANONE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
2-HEXANONE	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
ACETONE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
BENZENE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
CARBON DISULFIDE	µg/kg	11 U	10 U	3 J	4 J	14 U	10 U	11 U	12 U
CARBON TETRACHLORIDE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
CHLOROETHANE	µg/kg	11 UJ	10 UJ	12 U	11 U	14 U	10 U	11 U	12 U
CHLOROFORM	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
CIS-1,3-DICHLOROPROPENE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
CYCLOHEXANE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
ETHYLBENZENE	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
METHYLCYCLOHEXANE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
METHYLENE CHLORIDE	µg/kg	11 U	10 U	2 J	11 U	14 U	2 J	11 U	12 U
TETRACHLOROETHYLENE(PCE)	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U
TOLUENE	µg/kg	11 U	10 UJ	12 UJ	11 U	68	10 U	68	12 U
TRANS-1,2-DICHLOROETHENE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
TRICHLOROETHYLENE	µg/kg	40	490	12 U	11 U	14 U	10 U	11 U	12 U
VINYL CHLORIDE	µg/kg	11 U	10 U	12 U	11 U	14 U	10 U	11 U	12 U
XYLENES, TOTAL	µg/kg	11 U	10 UJ	12 UJ	11 U	14 U	10 U	11 U	12 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-045	SO-045	SO-046	SO-047	SO-048	SO-050	SO-050	SO-051
	Sample:	E2GN0	E2GN2	E2GT4	E2GT8	E2GW5	E2GY4	E2GY5	E2GY7
	Interval:	0 - 0.5	1.5 - 2.5	1.2 - 2.2	1 - 2	1.7 - 2.7	0 - 0.5	1 - 1.8	1.4 - 3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/2/2005	2/2/2005	2/10/2005	2/10/2005	2/11/2005	2/17/2005	2/17/2005	2/17/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
1,1-DICHLOROETHANE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	13 UJ	11 UJ	10 U	10 UJ	11 UJ	14 U	10 U	10 U
1,2,4-TRICHLOROBENZENE	µg/kg	13 UJ	11 UJ	10 U	10 UJ	11 U	14 U	10 U	10 U
1,2-DICHLOROBENZENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
1,3-DICHLOROBENZENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
1,4-DICHLOROBENZENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
2-BUTANONE	µg/kg	13 U	11 U	10 U	10 UJ	11 UJ	14 U	10 U	10 U
2-HEXANONE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
ACETONE	µg/kg	9 J	8 J	10 U	10 UJ	11 UJ	14 U	10 U	10 U
BENZENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 UJ
CARBON DISULFIDE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
CARBON TETRACHLORIDE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
CHLOROETHANE	µg/kg	13 U	11 U	10 UJ	10 UJ	11 U	14 UJ	10 UJ	10 UJ
CHLOROFORM	µg/kg	13 U	11 U	10 U	10 UJ	5 J	14 U	10 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
CYCLOHEXANE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
ETHYLBENZENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
METHYLCYCLOHEXANE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
METHYLENE CHLORIDE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	6 J	10 U	5 J
TETRACHLOROETHYLENE(PCE)	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
TOLUENE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 UJ
TRANS-1,2-DICHLOROETHENE	µg/kg	13 U	11 U	10 U	10 J	35	14 U	10 U	10 U
TRICHLOROETHYLENE	µg/kg	13 U	11 U	12	9,500 J	5,100	38	18	10 UJ
VINYL CHLORIDE	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U
XYLENES, TOTAL	µg/kg	13 U	11 U	10 U	10 UJ	11 U	14 U	10 U	10 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-052	SO-052	SO-053	SO-053	SO-054	SO-055	SO-056	SO-056
	Sample:	E2GY8	E2GY9	E2GZ1	E2GZ2	E2GZ4	E2GZ8	E2HA0	E2HA1
	Interval:	0 - 0.5	0.5 - 1.3	2.3 - 3.8	2.3 - 3.8	0.6 - 2.7	4 - 5	1.7 - 2	1.7 - 2
	Matrix:	Soil	Soil	Soil	Soil, dup	Soil	Soil	Soil	Soil, dup
	Date:	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/22/2005	2/22/2005	2/22/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	14 J	13 J
1,1-DICHLOROETHANE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
1,1-DICHLOROETHYLENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
1,2,4-TRICHLOROBENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
1,2-DICHLOROBENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
1,3-DICHLOROBENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
1,4-DICHLOROBENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
2-BUTANONE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
2-HEXANONE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
ACETONE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
BENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
CARBON DISULFIDE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
CARBON TETRACHLORIDE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
CHLOROETHANE	µg/kg	13 UJ	10 UJ	10 UJ	10 UJ	11 UJ	10 UJ	10 UJ	10 UJ
CHLOROFORM	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	7 J	7 J
CIS-1,3-DICHLOROPROPENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
CYCLOHEXANE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
ETHYLBENZENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
ISOPROPYLBENZENE (CUMENE)	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
METHYLCYCLOHEXANE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
METHYLENE CHLORIDE	µg/kg	4 J	3 J	4 J	10 U	11 U	10 UJ	10 UJ	10 UJ
TETRACHLOROETHYLENE(PCE)	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
TOLUENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
TRANS-1,2-DICHLOROETHENE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	36 J	51 J
TRICHLOROETHYLENE	µg/kg	32	160	65 J	37	11 U	38 J	28,000	33,000
VINYL CHLORIDE	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ
XYLENES, TOTAL	µg/kg	13 U	10 U	10 UJ	10 U	11 U	10 UJ	10 UJ	10 UJ

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-057	SO-057	SO-058	SO-062	SO-062	SO-062	SO-064	SO-064
	Sample:	05CK14-12	E2HA5	E2HB0	E2HC7	E2HC8	E2HC9	E2HD1	E2HD2
	Interval:	26.5 - 30.5	2 - 3	1.1 - 1.7	0.8 - 2.3	22 - 24.6	4 - 5.5	4 - 6.6	16 - 17.2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/24/2005	2/23/2005	3/1/2005	3/15/2005	3/15/2005	3/15/2005	3/16/2005	3/16/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	8,500,000 U	11 UJ	10 U	16,000	1,600 U	330 J	11 U	10 U
1,1-DICHLOROETHANE	µg/kg	12,000,000 U	11 UJ	10 U	530 J	1,600 U	1,500 U	11 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	12,000,000 U	11 UJ	10 U	1,300 J	1,600 U	1,500 U	11 U	10 U
1,2,4-TRICHLOROBENZENE	µg/kg	10,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
1,2-DICHLOROBENZENE	µg/kg	4,700,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
1,3-DICHLOROBENZENE	µg/kg	10,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
1,4-DICHLOROBENZENE	µg/kg	8,500,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
2-BUTANONE	µg/kg	200,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
2-HEXANONE	µg/kg	180,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
ACETONE	µg/kg	280,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	23	18
BENZENE	µg/kg	4,700,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
CARBON DISULFIDE	µg/kg	27,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
CARBON TETRACHLORIDE	µg/kg	8,500,000 U	11 UJ	10 U	2,300	1,600 U	1,500 U	11 U	10 U
CHLOROETHANE	µg/kg	15,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
CHLOROFORM	µg/kg	8,500,000 U	11 UJ	10 U	460 J	1,600 U	1,500 U	11 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	14,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
CYCLOHEXANE	µg/kg		11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
ETHYLBENZENE	µg/kg	6,600,000 U	11 UJ	10 U	410 J	1,600 U	1,500 U	11 U	10 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	10,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	110,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
METHYLCYCLOHEXANE	µg/kg		11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
METHYLENE CHLORIDE	µg/kg	24,000,000 U	9 J	10 UJ	330 J	380 J	310 J	11 U	10 U
TETRACHLOROETHYLENE(PCE)	µg/kg	12,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
TOLUENE	µg/kg	6,600,000 U	11 UJ	10 U	460 J	1,600 U	1,500 U	11 U	10 U
TRANS-1,2-DICHLOROETHENE	µg/kg	15,000,000 U	11 UJ	21	1,500 U	1,600 U	1,500 U	11 U	10 U
TRICHLOROETHYLENE	µg/kg	1,600,000,000	12 J	11	340 J	4,500	1,500 U	11 U	10 U
VINYL CHLORIDE	µg/kg	10,000,000 U	11 UJ	10 U	1,500 U	1,600 U	1,500 U	11 U	10 U
XYLENES, TOTAL	µg/kg	18,000,000 U	11 UJ	10 U	740 J	1,600 U	1,500 U	11 U	10 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-067	SO-067	SO-067	SO-069	SO-069	SO-069	SO-070	SO-070
	Sample:	E2HD3	E2HD4	E2HD5	E2HE5	E2HE6	E2HE7	E2HE9	E2HF0
	Interval:	4.5 - 5.5	6 - 6.5	6 - 6.5	0 - 1.7	8 - 10.4	8 - 10.4	28 - 28.9	3.3 - 4.5
	Matrix:	Soil	Soil	Soil, dup	Soil	Soil	Soil, dup	Soil	Soil
	Date:	3/17/2005	3/17/2005	3/17/2005	3/21/2005	3/21/2005	3/21/2005	3/22/2005	3/22/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	11 U	12 U	11 U	10	11	10	12	5
1,1-DICHLOROETHANE	µg/kg	11 U	12 U	11 U	10	11	10	12	4
1,1-DICHLOROETHYLENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
1,2,4-TRICHLOROBENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
1,2-DICHLOROBENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
1,3-DICHLOROBENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
1,4-DICHLOROBENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
2-BUTANONE	µg/kg	4 J	10 J	8 J	10	11	10	12	10
2-HEXANONE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
ACETONE	µg/kg	32 U	37 U	35 U	10	11	4	12	3
BENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
CARBON DISULFIDE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
CARBON TETRACHLORIDE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
CHLOROETHANE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
CHLOROFORM	µg/kg	11 U	12 U	11 U	10	11	10	12	2
CIS-1,3-DICHLOROPROPENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
CYCLOHEXANE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
ETHYLBENZENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
ISOPROPYLBENZENE (CUMENE)	µg/kg	11 U	12 U	11 U	10	11	10	12	10
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	11 U	12 U	11 U	10	11	10	12	10
METHYLCYCLOHEXANE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
METHYLENE CHLORIDE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
TETRACHLOROETHYLENE(PCE)	µg/kg	11 U	12 U	11 U	10	11	10	12	10
TOLUENE	µg/kg	11 U	12 U	11 U	10	11	10	12	10
TRANS-1,2-DICHLOROETHENE	µg/kg	4 J	3 J	4 J	10	11	10	12	20
TRICHLOROETHYLENE	µg/kg	1,200	110	120	8	11	10	12	100,000
VINYL CHLORIDE	µg/kg	11 U	5 J	4 J	10	17	4	15	10
XYLENES, TOTAL	µg/kg	11 U	12 U	11 U	10	11	10	12	10

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-070	SO-071	SO-071	SO-071	SO-074	SO-074	SO-079	SO-079
	Sample:	E2HF1	E2HF3	E2HF4	E2HF5	E2HF7	E2HF8	E2HF9	E2HG0
	Interval:	9.5 - 10.5	9.3 - 10.3	25 - 26.1	25 - 26.1	2.1 - 2.4	22 - 22.9	1.4 - 2.7	2.7 - 3.6
	Matrix:	Soil	Soil	Soil	Soil, dup	Soil	Soil	Soil	Soil
	Date:	3/22/2005	3/22/2005	3/22/2005	3/22/2005	3/24/2005	3/24/2005	3/29/2005	3/29/2005
Volatile Organical Compounds									
1,1,1-TRICHLOROETHANE	µg/kg	12	11	12	11	20	11	12 U	12 U
1,1-DICHLOROETHANE	µg/kg	12	11	12	11	20	11	12 U	12 U
1,1-DICHLOROETHYLENE	µg/kg	12	11	90	23	20	5	12 UJ	12 UJ
1,2,4-TRICHLOROBENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
1,2-DICHLOROBENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
1,3-DICHLOROBENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
1,4-DICHLOROBENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
2-BUTANONE	µg/kg	12	11	12	11	20	11	12 U	12 U
2-HEXANONE	µg/kg	12	11	12	11	20	11	12 R	12 R
ACETONE	µg/kg	12	11	12	11	20	11	32 UJ	31 UJ
BENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
CARBON DISULFIDE	µg/kg	12	3	2	11	29	11	12 UJ	12 UJ
CARBON TETRACHLORIDE	µg/kg	12	11	12	11	20	11	12 U	12 U
CHLOROETHANE	µg/kg	12	11	12	11	20	11	12 U	12 U
CHLOROFORM	µg/kg	12	11	12	11	20	11	12 U	12 U
CIS-1,3-DICHLOROPROPENE	µg/kg	12	11	12	11	20	11	12 U	12 U
CYCLOHEXANE	µg/kg	12	11	12	11	20	11	12 U	12 U
ETHYLBENZENE	µg/kg	12	11	12	11	20	11	12 U	12 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	12	11	12	11	20	11	12 U	12 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	12	11	12	11	20	11	12 R	12 R
METHYLCYCLOHEXANE	µg/kg	12	11	12	11	20	11	12 U	12 U
METHYLENE CHLORIDE	µg/kg	12	11	12	11	20	4	18 UJ	19 UJ
TETRACHLOROETHYLENE(PCE)	µg/kg	12	11	12	11	20	11	12 U	12 U
TOLUENE	µg/kg	12	11	4	11	20	11	12 U	12 U
TRANS-1,2-DICHLOROETHENE	µg/kg	12	11	140	39	15	45	12 UJ	12 UJ
TRICHLOROETHYLENE	µg/kg	53	11	34,000	60,000	310	260	34	6 J
VINYL CHLORIDE	µg/kg	12	11	3,200	71	20	190	12 U	12 U
XYLENES, TOTAL	µg/kg	12	11	12	11	20	11	12 U	12 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2
Appendix C
OMC Soil
Volatile Organic Compounds

	Station:	SO-079	SO-081	SO-081	SO-081	SO-081	SO-081	SO-082
	Sample:	E2HG1	E2HG2	E2HG3	E2HG4	E2HG7	E2HG8	E2HG5
	Interval:	24 - 24.9	4 - 4.9	8 - 8.7	8 - 8.7	25 - 26.9	25 - 26.9	4 - 5
	Matrix:	Soil	Soil	Soil	Soil, dup	Soil	Soil, dup	Soil
	Date:	3/29/2005	3/30/2005	3/30/2005	3/30/2005	3/31/2005	3/31/2005	3/30/2005
Volatile Organical Compounds								
1,1,1-TRICHLOROETHANE	µg/kg	11 U	1,400 U	14 J	1,500 U	1,400 U	1,600 U	10 U
1,1-DICHLOROETHANE	µg/kg	11 U	1,400 U	37 J	1,500 U	1,400 U	1,600 U	10 U
1,1-DICHLOROETHYLENE	µg/kg	11 UJ	1,400 UJ	11 UJ	1,500 UJ	1,400 UJ	1,600 UJ	10 UJ
1,2,4-TRICHLOROBENZENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
1,2-DICHLOROBENZENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
1,3-DICHLOROBENZENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
1,4-DICHLOROBENZENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
2-BUTANONE	µg/kg	11 U	1,400 U	6 J	1,500 U	1,400 U	1,600 U	10 U
2-HEXANONE	µg/kg	11 R	1,400 U	11 R	1,500 U	1,400 U	1,600 U	3 J
ACETONE	µg/kg	29 UJ	3,500 UJ	34 UJ	3,900 UJ	3,800 UJ	4,400 UJ	22 UJ
BENZENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
CARBON DISULFIDE	µg/kg	11 UJ	1,400 UJ	11 UJ	1,500 UJ	1,400 UJ	1,600 UJ	10 UJ
CARBON TETRACHLORIDE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
CHLOROETHANE	µg/kg	11 U	1,400 U	27 J	1,500 U	1,400 UJ	1,600 UJ	10 U
CHLOROFORM	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
CIS-1,3-DICHLOROPROPENE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
CYCLOHEXANE	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,400 U	1,600 U	10 U
ETHYLBENZENE	µg/kg	11 U	1,400 U	10 J	1,500 U	450 J	530 J	10 U
ISOPROPYLBENZENE (CUMENE)	µg/kg	11 U	1,400 U	2 J	1,500 U	1,400 U	1,600 U	10 U
METHYL ISOBUTYL KETONE (4-METHYL-2-PENTANONE)	µg/kg	11 R	1,400 U	11 R	1,500 U	1,400 U	1,600 U	12 J
METHYLCYCLOHEXANE	µg/kg	11 U	1,400 U	21 J	1,500 U	1,400 U	1,600 U	10 U
METHYLENE CHLORIDE	µg/kg	17 UJ	1,400 UJ	11 UJ	1,500 UJ	1,400 U	1,600 U	10 UJ
TETRACHLOROETHYLENE(PCE)	µg/kg	11 U	1,400 U	11 UJ	1,500 U	1,900	1,900	10 U
TOLUENE	µg/kg	11 U	1,400 U	8 J	1,500 U	1,400 U	1,600 U	10 U
TRANS-1,2-DICHLOROETHENE	µg/kg	6 J	1,400 UJ	5 J	1,500 UJ	250 J	1,600 UJ	10 UJ
TRICHLOROETHYLENE	µg/kg	5 J	1,500	62 J	1,000 J	1,300,000 J	1,200,000	10 U
VINYL CHLORIDE	µg/kg	150	1,400 U	6 J	1,500 U	1,400 U	1,600 U	10 U
XYLENES, TOTAL	µg/kg	11 U	1,400 U	30 J	1,500 U	2,100	2,300	10 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	S-29	S-29	S-30	S-30	S-31	S-31	S-32	S-32	S-33
	Sample:	S-29,2'	S-29,6'	S-30,2'	S-30,6'	S-31,2'	S-31,6'	S-32,2'	S-32,6'	S-33,10'
	Interval:	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6	10 - 10
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	1,900 U	200 U	99 U	200 U	380 U	19 U	990 U	20 U	20 U
PCB-1242 (AROCHLOR 1242)	µg/kg	1,900 U	200 U	99 U	200 U	380 U	19 U	990 U	20 U	20 U
PCB-1248 (AROCHLOR 1248)	µg/kg	16,000	1,300	1,200	1,300	3,200	55	6,200	160	31
PCB-1254 (AROCHLOR 1254)	µg/kg	1,900 U	200 U	99 U	200 U	380 U	19 U	990 U	20 U	20 U
PCB-1260 (AROCHLOR 1260)	µg/kg	1,900 U	200 U	99 U	200 U	380 U	19 U	990 U	20 U	20 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	S-33	S-34	S-34	S-35	S-35	S-36	S-36	S-37	S-37
	Sample:	S-33,8'	S-34,2'	S-34,6'	S-35,2'	S-35,6'	S-36,2'	S-36,6'	S-37,2'	S-37,6'
	Interval:	8 - 8	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	19 U	930,000 U	98 U	20 U	20 U	180 U	380 U	170 U	190 U
PCB-1242 (AROCHLOR 1242)	µg/kg	19 U	930,000 U	98 U	20 U	20 U	180 U	380 U	170 U	190 U
PCB-1248 (AROCHLOR 1248)	µg/kg	12 J	14,000,000	410	200	210	960	3,700	960	1,500
PCB-1254 (AROCHLOR 1254)	µg/kg	19 U	930,000 U	98 U	20 U	20 U	180 U	380 U	170 U	190 U
PCB-1260 (AROCHLOR 1260)	µg/kg	19 U	930,000 U	98 U	20 U	20 U	180 U	380 U	170 U	190 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	S-38	S-38	S-39	S-39	S-40	S-40	S-41	S-41	S-42
	Sample:	S-38,2'	S-38,6'	S-39,10'	S-39,8'	S-40,2'	S-40,6'	S-41,2'	S-41,6'	S-42,2'
	Interval:	2 - 2	6 - 6	10 - 10	8 - 8	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/20/2005	5/23/2005	5/23/2005	5/23/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	33 U	190 U	19 U	20 U	17 U	970 U	17 U	380 U	38 U
PCB-1242 (AROCHLOR 1242)	µg/kg	33 U	190 U	19 U	20 U	17 U	970 U	17 U	380 U	38 U
PCB-1248 (AROCHLOR 1248)	µg/kg	140	930	9.1 Ja	280	76	2,800	270	3,900	430
PCB-1254 (AROCHLOR 1254)	µg/kg	33 U	190 U	19 U	20 U	17 U	970 U	17 U	380 U	38 U
PCB-1260 (AROCHLOR 1260)	µg/kg	33 U	190 U	19 U	20 U	17 U	970 U	17 U	380 U	38 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	S-42	S-43	S-43	S-44	S-44	S-45	S-45	S-46	S-46
	Sample:	S-42,6'	S-43,2'	S-43,6'	S-44,2'	S-44,6'	S-45,2'	S-45,6'	S-46,2'	S-46,6'
	Interval:	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6	2 - 2	6 - 6
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	5/23/2005	5/23/2005	5/23/2005	5/23/2005	5/23/2005	5/23/2005	5/23/2005	5/23/2005	5/23/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	20 U	20 U	19 U	100 U	20 U	19 U	200 U	98 U	210 U
PCB-1242 (AROCHLOR 1242)	µg/kg	20 U	20 U	19 U	100 U	20 U	19 U	200 U	98 U	210 U
PCB-1248 (AROCHLOR 1248)	µg/kg	250	130	160	510	210	260	500	620	310
PCB-1254 (AROCHLOR 1254)	µg/kg	20 U	20 U	19 U	100 U	20 U	19 U	200 U	98 U	210 U
PCB-1260 (AROCHLOR 1260)	µg/kg	20 U	20 U	19 U	100 U	20 U	19 U	200 U	98 U	210 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	S-47	S-47	SO-001	SO-001	SO-002	SO-002	SO-003	SO-004	SO-004
	Sample:	S-47,2'	S-47,6'	E2GM4	E2GM5	E2GM6	E2GM7	E2GK0	E2GN4	E2GN5
	Interval:	2 - 2	6 - 6	0 - 0.5	0.7 - 1.6	0 - 0.5	0.5 - 1.3	0 - 0.5	0 - 0.5	0.6 - 1.4
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	5/23/2005	5/23/2005	2/2/2005	2/2/2005	2/2/2005	2/2/2005	1/31/2005	2/2/2005	2/2/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	96 U	2,000 U	42 U	180 U	34 U	36 U	36 U	36 U	39 U
PCB-1242 (AROCHLOR 1242)	µg/kg	96 U	2,000 U	42 U	180 U	34 U	36 U	36 U	36 U	39 U
PCB-1248 (AROCHLOR 1248)	µg/kg	660	17,000	1,000 J	5,300	28 J	340	200 J	480	34 J
PCB-1254 (AROCHLOR 1254)	µg/kg	96 U	2,000 U	42 U	180 U	34 U	36 U	36 U	36 U	39 U
PCB-1260 (AROCHLOR 1260)	µg/kg	96 U	2,000 U	42 U	180 U	34 U	36 U	36 U	36 U	39 U

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	SO-005	SO-006	SO-006	SO-007	SO-007	SO-008	SO-009	SO-010	SO-010
	Sample:	E2GN6	E2GN8	E2GN9	E2GP0	E2GP1	E2GK2	E2GK4	E2GK6	E2GK7
	Interval:	0 - 0.5	0 - 0.5	0.7 - 0.8	0 - 0.5	0.7 - 1.4	0 - 0.5	0 - 0.5	0 - 0.5	1.5 - 2.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/2/2005	2/7/2005	2/7/2005	2/7/2005	2/7/2005	1/31/2005	1/31/2005	1/31/2005	1/31/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	39 U	45 U	370 U	36 U	38 U	350 U	36 U	35 U	38 U
PCB-1242 (AROCHLOR 1242)	µg/kg	39 U	45 U	370 U	36 U	38 U	350 U	36 U	35 U	38 U
PCB-1248 (AROCHLOR 1248)	µg/kg	400 J	240	25,000	1,800 J	37 J	3,500 J	160 J	180	11 J
PCB-1254 (AROCHLOR 1254)	µg/kg	39 U	190	18,000	1,300 J	30 J	350 U	36 U	35 U	38 U
PCB-1260 (AROCHLOR 1260)	µg/kg	39 U	45 U	2,500	150 J	38 U	350 U	36 U	190	38 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

		SO-011	SO-012	SO-013	SO-014	SO-014	SO-014	SO-015	SO-015	SO-016
	Station:	SO-011	SO-012	SO-013	SO-014	SO-014	SO-014	SO-015	SO-015	SO-016
	Sample:	E2GP2	E2GP4	E2GP6	E2GX0	E2GX1	E2GX2	E2GR8	E2GR9	E2GX3
	Interval:	0 - 0.5	0 - 0.5	0 - 0.5	0 - 0.5	1.5 - 2	1.5 - 2	0.3 - 0.8	0.8 - 1.2	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil	Soil
	Date:	2/7/2005	2/7/2005	2/7/2005	2/17/2005	2/17/2005	2/17/2005	2/9/2005	2/9/2005	2/17/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	36 U	35 U	35 U	3,500 U	3,700 U	3,700 U	490 U	38 U	40 U
PCB-1242 (AROCHLOR 1242)	µg/kg	36 U	35 U	35 U	3,500 U	480,000 J	370,000 J	490 U	38 U	40 U
PCB-1248 (AROCHLOR 1248)	µg/kg	39 J	370 J	440 J	480,000	3,700 U	3,700 U	13,000	1,800 J	410
PCB-1254 (AROCHLOR 1254)	µg/kg	43	360	320 J	190,000	3,700 U	3,700 U	15,000	1,900	270 J
PCB-1260 (AROCHLOR 1260)	µg/kg	36 U	74	58 J	210,000 J	3,700 U	3,700 U	3,800	180 J	210

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	SO-016	SO-017	SO-017	SO-018	SO-018	SO-019	SO-020	SO-020	SO-021
	Sample:	E2GX4	E2GX5	E2GX6	E2GX7	E2GX8	E2GX9	E2GK8	E2GK9	E2GL0
	Interval:	1.5 - 2	0 - 0.5	1.4 - 2	0 - 0.5	2.8 - 3.3	0 - 0.5	0 - 0.5	0.5 - 1.5	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/1/2005	2/1/2005	2/1/2005
PCBs										
PCB-1232 (AROCHLOR 1232)	µg/kg	37 U	350 U	40 U	35 U	380 U	36 U	34 U	36 U	37 U
PCB-1242 (AROCHLOR 1242)	µg/kg	37 U	350 U	40 U	35 U	380 U	36 U	34 U	36 U	37 U
PCB-1248 (AROCHLOR 1248)	µg/kg	3,600 J	29,000	190	97 J	12,000	440	53 J	1,100 J	120
PCB-1254 (AROCHLOR 1254)	µg/kg	2,800	25,000	160	39 J	3,200 J	230	34 U	36 U	37 U
PCB-1260 (AROCHLOR 1260)	µg/kg	430 J	2,800 J	40 U	26 J	200 J	56	34 U	36 U	37 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2a
Appendix C
OMC Soil
PCBs

	Station:	SO-021	SO-022	SO-022	SO-023	SO-023
	Sample:	E2GL1	E2GL2	E2GL3	E2GL4	E2GL5
	Interval:	1 - 2	0 - 0.5	1 - 2	0 - 0.5	1.5 - 2.5
	Matrix:	Soil	Soil	Soil	Soil	Soil
	Date:	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/1/2005
PCBs						
PCB-1232 (AROCHLOR 1232)	µg/kg	190 U	38 U	38 U	34 U	39 U
PCB-1242 (AROCHLOR 1242)	µg/kg	190 U	38 U	38 U	34 U	39 U
PCB-1248 (AROCHLOR 1248)	µg/kg	5,400 J	64	95	32 J	2,300
PCB-1254 (AROCHLOR 1254)	µg/kg	190 U	38 U	38 U	34 U	39 U
PCB-1260 (AROCHLOR 1260)	µg/kg	190 U	38 U	38 U	34 U	39 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-024	SO-024	SO-025	SO-025	SO-026	SO-026	SO-026	SO-027
	Sample:	E2GL6	E2GL7	E2GM8	E2GM9	E2GP8	E2GP9	E2GQ0	E2GL8
	Interval:	0 - 0.5	1.5 - 2.5	0 - 0.5	2.2 - 2.5	0 - 0.5	1 - 2	1 - 2	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil
	Date:	2/1/2005	2/1/2005	2/2/2005	2/2/2005	2/7/2005	2/7/2005	2/7/2005	2/1/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	36 U	38 U	34 U	75,000 U	36 U	36 U	36 U	35 U
PCB-1242 (AROCHLOR 1242)	µg/kg	36 U	38 U	34 U	75,000 U	36 U	36 U	36 U	35 U
PCB-1248 (AROCHLOR 1248)	µg/kg	53	28 J	54 J	790,000 J	1,100 J	40 J	36 U	35 U
PCB-1254 (AROCHLOR 1254)	µg/kg	36 U	38 U	34 U	75,000 U	970 J	77 J	26 J	8.2 J
PCB-1260 (AROCHLOR 1260)	µg/kg	36 U	38 U	34 U	75,000 U	95 J	38 J	36 U	35 U

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-027	SO-028	SO-028	SO-029	SO-029	SO-030	SO-030	SO-030
	Sample:	E2GL9	E2GM0	E2GM1	E2GM2	E2GM3	E2GY1	E2GY2	E2GY3
	Interval:	1 - 2	0 - 0.5	1.5 - 2.5	0 - 0.5	1.5 - 2.5	0 - 0.5	2 - 3	2 - 3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil, dup
	Date:	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/1/2005	2/17/2005	2/17/2005	2/17/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	370 U	37 U	38 U	36 U	39 U	35 U	39 U	39 U
PCB-1242 (AROCHLOR 1242)	µg/kg	370 U	37 U	38 U	36 U	39 U	35 U	39 U	39 U
PCB-1248 (AROCHLOR 1248)	µg/kg	32,000	16 J	50	36 U	2,000 J	550 J	300	710
PCB-1254 (AROCHLOR 1254)	µg/kg	370 U	37 U	38 U	110 J	39 U	330	200	450
PCB-1260 (AROCHLOR 1260)	µg/kg	370 U	37 U	38 U	36 U	39 U	40 J	29 J	60 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-031	SO-032	SO-032	SO-033	SO-033	SO-034	SO-034	SO-035
	Sample:	E2GQ2	E2GS5	E2GS6	E2GS7	E2GS8	E2GS9	E2GT0	E2GQ4
	Interval:	1.5 - 2.5	0 - 0.5	14 - 1.6	0 - 0.5	2.4 - 2.6	0 - 0.5	2 - 3	1 - 2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/7/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005	2/8/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	36 U	38 U	41 U	370 U	38 U	38 U	39 U	35 U
PCB-1242 (AROCHLOR 1242)	µg/kg	36 U	38 U	41 U	370 U	38 U	38 U	39 U	35 U
PCB-1248 (AROCHLOR 1248)	µg/kg	830 J	1,900	2,900	300 J	92	3,700	120	2,300
PCB-1254 (AROCHLOR 1254)	µg/kg	820	1,800	1,500 J	560 J	94 J	3,700	66	1,800
PCB-1260 (AROCHLOR 1260)	µg/kg	66 J	190 J	180 J	370 U	30 J	350 J	39 U	250

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-036	SO-036	SO-037	SO-037	SO-038	SO-038	SO-039	SO-039
	Sample:	E2GQ5	E2GQ6	E2GS0	E2GS1	E2GQ7	E2GQ8	E2GQ9	E2GR0
	Interval:	0 - 0.5	1 - 2	0 - 0.5	1 - 2	0 - 0.5	1 - 2	0 - 0.5	0.6 - 1.3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/8/2005	2/8/2005	2/9/2005	2/9/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	33 U	35 U	34 U	35 U	35 U	35 U	33 U	36 U
PCB-1242 (AROCHLOR 1242)	µg/kg	33 U	35 U	34 U	35 U	35 U	35 U	33 U	36 U
PCB-1248 (AROCHLOR 1248)	µg/kg	34	3,800 J	920	710	270 J	770	33 J	46
PCB-1254 (AROCHLOR 1254)	µg/kg	28 J	2,200	730	240 J	330 J	250 J	38	53 J
PCB-1260 (AROCHLOR 1260)	µg/kg	33 U	340 J	150 J	55 J	73 J	31 J	33 U	35 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-040	SO-040	SO-041	SO-041	SO-041	SO-042	SO-042	SO-043
	Sample:	E2GR1	E2GR2	E2GR3	E2GR4	E2GR5	E2GR6	E2GR7	E2GS2
	Interval:	0 - 0.5	1.5 - 2	0 - 0.5	1.4 - 2.4	1.4 - 2.4	0 - 0.5	1.5 - 2.5	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil	Soil
	Date:	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/9/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	37 U	35 U	39 U	37 U	37 U	380 U	390 U	380 U
PCB-1242 (AROCHLOR 1242)	µg/kg	37 U	35 U	39 U	37 U	37 U	380 U	390 U	380 U
PCB-1248 (AROCHLOR 1248)	µg/kg	670	920	1,900	1,800	2,100	7,900	17,000	26,000
PCB-1254 (AROCHLOR 1254)	µg/kg	330 J	840	1,900	1,600	1,800	8,700	13,000	20,000 J
PCB-1260 (AROCHLOR 1260)	µg/kg	97 J	110 J	210 J	180 J	190 J	1100 J	1200	3,500 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-043	SO-045	SO-045	SO-045	SO-045	SO-052	SO-053	SO-053
	Sample:	E2GS3	E2GN0	E2GN1	E2GN2	E2GN3	E2GY9	E2GZ1	E2GZ2
	Interval:	2.8 - 3	0 - 0.5	0 - 0.5	1.5 - 2.5	1.5 - 2.5	0.5 - 1.3	2.3 - 3.8	2.3 - 3.8
	Matrix:	Soil	Soil	Soil, dup	Soil	Soil, dup	Soil	Soil	Soil, dup
	Date:	2/9/2005	2/2/2005	2/2/2005	2/2/2005	2/2/2005	2/17/2005	2/17/2005	2/17/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	32,000	36 U	36 UJ	37 U	39 U	39 U	35 U	35 U
PCB-1242 (AROCHLOR 1242)	µg/kg	400 U	36 U	36 UJ	37 U	39 U	39 U	35 U	35 U
PCB-1248 (AROCHLOR 1248)	µg/kg	400 U	71 J	9.5 J	18 J	22 J	490	100 J	60
PCB-1254 (AROCHLOR 1254)	µg/kg	960	36 U	36 UJ	37 U	39 U	39 U	80 J	58 J
PCB-1260 (AROCHLOR 1260)	µg/kg	790	36 U	36 UJ	37 U	39 U	39 U	64	52

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-062	SO-064	SO-064	SO-064	SO-069	SO-070	SO-071	SO-074
	Sample:	E2HC9	E2HD0	E2HD1	E2HD2	E2HE5	E2HF0	E2HF2	E2HF6
	Interval:	4 - 5.5	0 - 1	4 - 6.6	16 - 17.2	0 - 1.7	3.3 - 4.5	4 - 5	0.4 - 0.8
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/15/2005	3/16/2005	3/16/2005	3/16/2005	3/21/2005	3/22/2005	3/22/2005	3/24/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	76 U	380 U	39 U	37 U	34	35	34	34
PCB-1242 (AROCHLOR 1242)	µg/kg	4500	380 U	39 U	37 U	34	35	34	34
PCB-1248 (AROCHLOR 1248)	µg/kg	76 U	9,400 J	120 J	33 J	110 J	4,000 J	110 J	420 J
PCB-1254 (AROCHLOR 1254)	µg/kg	76 U	380 U	39 U	37 U	34	35	34	34
PCB-1260 (AROCHLOR 1260)	µg/kg	76 U	380 U	39 U	37 U	34	290	34	46

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-074	SO-079	SO-081	SO-081	SO-081	SO-081	SO-082	SO-082
	Sample:	E2HF7	E2HF9	E2HG2	E2HG3	E2HG4	E2HG8	E2HG5	E2HG6
	Interval:	2.1 - 2.4	1.4 - 2.7	4 - 4.9	8 - 8.7	8 - 8.7	25 - 26.9	4 - 5	8 - 8.7
	Matrix:	Soil	Soil	Soil	Soil	Soil, dup	Soil, dup	Soil	Soil
	Date:	3/24/2005	3/29/2005	3/30/2005	3/30/2005	3/30/2005	3/31/2005	3/30/2005	3/30/2005
PCBs									
PCB-1232 (AROCHLOR 1232)	µg/kg	46	36 U	35 U	42 U	39 U	41 U	340 U	40 U
PCB-1242 (AROCHLOR 1242)	µg/kg	46	36 U	35 U	42 U	39 U	41 U	35 U	40 U
PCB-1248 (AROCHLOR 1248)	µg/kg	1,500 J	31 J	110 J	660 J	750 J	1,000	16,000	370 J
PCB-1254 (AROCHLOR 1254)	µg/kg	46	36 U	35 U	42 U	39 U	41 U	340 U	40 U
PCB-1260 (AROCHLOR 1260)	µg/kg	52	36 U	35 U	42 U	39 U	41 U	340 U	40 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-2b
Appendix C
OMC Soil
PCBs

	Station:	SO-082
	Sample:	E2HG9
	Interval:	17.3 - 18.7
	Matrix:	Soil
	Date:	3/31/2005
PCBs		
PCB-1232 (AROCHLOR 1232)	µg/kg	49 U
PCB-1242 (AROCHLOR 1242)	µg/kg	49 U
PCB-1248 (AROCHLOR 1248)	µg/kg	1,600
PCB-1254 (AROCHLOR 1254)	µg/kg	49 U
PCB-1260 (AROCHLOR 1260)	µg/kg	49 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-002	SO-003	SO-006	SO-006	SO-007	SO-007	SO-008
	Sample:	E2GM6	E2GK0	E2GN8	E2GN9	E2GP0	E2GP1	E2GK2
	Interval:	0 - 0.5	0 - 0.5	0 - 0.5	0.7 - 0.8	0 - 0.5	0.7 - 1.4	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/2/2005	1/31/2005	2/7/2005	2/7/2005	2/7/2005	2/7/2005	1/31/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
2-METHYLNAPHTHALENE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
3,3'-DICHLOROBENZIDINE	µg/kg	10,000 U	10,000 U	450 UJ	370 UJ	3,600 UJ	380 UJ	10,000 U
4-CHLORO-3-METHYLPHENOL	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
ACENAPHTHENE	µg/kg	950 J	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
ACENAPHTHYLENE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	300 J	10,000 U
ACETOPHENONE	µg/kg	10,000 U	10,000 U	55 J	100 J	3,600 U	380 U	10,000 U
ANTHRACENE	µg/kg	1,700 J	10,000 U	13 J	51 J	3,600 U	130 J	10,000 U
BENZALDEHYDE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
BENZO(A)ANTHRACENE	µg/kg	9,000 J	10,000 U	100 J	190 J	980 J	1,600	1,700 J
BENZO(A)PYRENE	µg/kg	10,000	10,000 U	140 J	350 J	1,600 J	2,800	3,400 J
BENZO(B)FLUORANTHENE	µg/kg	11,000 J	10,000 U	150 J	320 J	1,800 J	2,900 J	4,000 J
BENZO(G,H,I)PERYLENE	µg/kg	5,300 J	10,000 U	110 J	220 J	1,000 J	1,800	2,000 J
BENZO(K)FLUORANTHENE	µg/kg	4,400 J	10,000 U	110 J	200 J	700 J	2,700	10,000 U
BENZYL BUTYL PHTHALATE	µg/kg	10,000 UJ	10,000 UJ	450 U	370 U	3,600 U	380 U	10,000 U
BIPHENYL (DIPHENYL)	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	10,000 U	10,000 U	450 U	370 U	480 J	230 J	10,000 U
CAPROLACTAM	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
CARBAZOLE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	55 J	10,000 U
CHRYSENE	µg/kg	8,200 J	10,000 U	150 J	220 J	1,100 J	2,000	1,600 J
DIBENZ(A,H)ANTHRACENE	µg/kg	10,000 U	10,000 U	49 J	100 J	670 J	1,400	10,000 U
DIBENZOFURAN	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
DIETHYL PHTHALATE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
DI-N-BUTYL PHTHALATE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
DI-N-OCTYLPHTHALATE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
FLUORANTHENE	µg/kg	26,000	10,000 U	320 J	320 J	1,300 J	1,300	1,200 J
FLUORENE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
HEXACHLOROBENZENE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	6,700 J	10,000 U	100 J	200 J	1,300 J	2,400	2,200 J
NAPHTHALENE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
N-NITROSODIPHENYLAMINE	µg/kg	10,000 U	10,000 U	450 U	370 U	3,600 U	380 U	10,000 U
PHENANTHRENE	µg/kg	4,900 J	10,000 U	110 J	69 J	3,600 U	120 J	10,000 U
PHENOL	µg/kg	10,000 U	10,000 U	450 U	370 U	470 J	380 U	10,000 U
PYRENE	µg/kg	29,000 J	10,000 UJ	240 J	380	1,700 J	2,200	3,200 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-009	SO-010	SO-011	SO-011	SO-012	SO-012	SO-013
	Sample:	E2GK4	E2GK6	E2GP2	E2GP3	E2GP4	E2GP5	E2GP7
	Interval:	0 - 0.5	0 - 0.5	0 - 0.5	1.2 - 1.9	0 - 0.5	1.6 - 2.6	1.4 - 1.9
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	1/31/2005	1/31/2005	2/7/2005	2/7/2005	2/7/2005	2/7/2005	2/7/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
2-METHYLNAPHTHALENE	µg/kg	10,000 U	380 U	700 J	350 U	3,500 U	390 U	390 U
3,3'-DICHLOROBENZIDINE	µg/kg	10,000 U	380 U	3,600 UJ	350 UJ	3,500 UJ	390 UJ	390 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
ACENAPHTHENE	µg/kg	10,000 U	380 U	440 J	350 U	3,500 U	390 U	390 U
ACENAPHTHYLENE	µg/kg	290 J	380 U	3,600 U	350 U	3,500 U	390 U	390 U
ACETOPHENONE	µg/kg	10,000 U	380 U	3,600 U	40 J	3,500 U	43 J	390 U
ANTHRACENE	µg/kg	270 J	380 U	950 J	350 U	3,500 U	390 U	390 U
BENZALDEHYDE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
BENZO(A)ANTHRACENE	µg/kg	3,000 J	380 U	1,900 J	350 U	3,500 U	140 J	390 U
BENZO(A)PYRENE	µg/kg	4,700 J	380 U	1,500 J	350 U	3,500 U	150 J	390 U
BENZO(B)FLUORANTHENE	µg/kg	6,100 J	380 U	1,100 J	350 U	3,500 U	130 J	390 U
BENZO(G,H,I)PERYLENE	µg/kg	3,400 J	380 U	1,100 J	350 U	3,500 U	150 J	390 U
BENZO(K)FLUORANTHENE	µg/kg	2,300 J	380 U	1,000 J	350 U	3,500 U	120 J	390 U
BENZYL BUTYL PHTHALATE	µg/kg	10,000 U	380 U	3,600 UJ	350 U	3,500 U	390 U	390 U
BIPHENYL (DIPHENYL)	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	10,000 U	380 U	380 J	350 U	3,500 U	390 U	49 J
CAPROLACTAM	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
CARBAZOLE	µg/kg	130 J	380 U	690 J	350 U	3,500 U	390 U	390 U
CHRYSENE	µg/kg	3,200 J	380 U	3,100 J	350 U	3,500 U	170 J	44 J
DIBENZ(A,H)ANTHRACENE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
DIBENZOFURAN	µg/kg	10,000 U	380 U	400 J	350 U	3,500 U	390 U	390 U
DIETHYL PHTHALATE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
DI-N-BUTYL PHTHALATE	µg/kg	140 J	380 U	3,600 U	350 U	3,500 U	390 U	390 U
DI-N-OCTYLPHTHALATE	µg/kg	10,000 U	380 U	3,600 UJ	350 U	3,500 U	390 U	390 U
FLUORANTHENE	µg/kg	2,300 J	380 U	4,700	350 U	490 J	260 J	390 U
FLUORENE	µg/kg	10,000 U	380 U	530 J	350 U	3,500 U	390 U	390 U
HEXACHLOROBENZENE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	10,000 U	380 U	1,300 J	350 U	3,500 U	55 J	390 U
NAPHTHALENE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
N-NITROSODIPHENYLAMINE	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
PHENANTHRENE	µg/kg	400 J	380 U	5,700	350 U	3,500 U	220 J	390 U
PHENOL	µg/kg	10,000 U	380 U	3,600 U	350 U	3,500 U	390 U	390 U
PYRENE	µg/kg	2,200 J	380 U	5,100	350 U	450 J	440	44 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

		SO-014	SO-014	SO-014	SO-015	SO-015	SO-016	SO-016
	Station:	SO-014	SO-014	SO-014	SO-015	SO-015	SO-016	SO-016
	Sample:	E2GX0	E2GX1	E2GX2	E2GR8	E2GR9	E2GX3	E2GX4
	Interval:	0 - 0.5	1.5 - 2	1.5 - 2	0.3 - 0.8	0.8 - 1.2	0 - 0.5	1.5 - 2
	Matrix:	Soil	Soil	Soil, dup	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	2/17/2005	2/9/2005	2/9/2005	2/17/2005	2/17/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	89 J	370 R	68 J	380 UJ	380 U	400 U	370 U
2-METHYLNAPHTHALENE	µg/kg	350 U	500	250 J	43 J	100 J	400 U	74 J
3,3'-DICHLOROBENZIDINE	µg/kg	350 UJ	370 UJ	370 UJ	380 UJ	380 UJ	400 UJ	370 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	350 U	370 R	63 J	380 U	380 U	400 U	370 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	110 J	87 J	79 J	380 U	380 U	400 U	370 U
ACENAPHTHENE	µg/kg	350 UJ	370 U	130 J	430	1,400	44 J	42 J
ACENAPHTHYLENE	µg/kg	350 UJ	370 U	370 U	380 U	380 U	400 U	370 U
ACETOPHENONE	µg/kg	74 J	370 U	120 J	380 U	380 U	400 U	370 U
ANTHRACENE	µg/kg	350 U	370 U	370 U	1,200	4,600	100 J	81 J
BENZALDEHYDE	µg/kg	38 J	370 U	370 U	42 J	380 U	400 U	370 U
BENZO(A)ANTHRACENE	µg/kg	350 UJ	370 UJ	370 UJ	2,200	7,900	320 J	230 J
BENZO(A)PYRENE	µg/kg	350 U	370 U	140 J	2,200	9,500	350 J	200 J
BENZO(B)FLUORANTHENE	µg/kg	350 U	370 U	190 J	1,100 J	8,000 J	390 J	190 J
BENZO(G,H,I)PERYLENE	µg/kg	350 U	370 U	210 J	1,200	4,000	730	320 J
BENZO(K)FLUORANTHENE	µg/kg	350 U	370 U	200 J	2,000 J	9,500	270 J	150 J
BENZYL BUTYL PHTHALATE	µg/kg	350 UJ	370 UJ	130 J	380 UJ	380 UJ	400 UJ	370 UJ
BIPHENYL (DIPHENYL)	µg/kg	350 UJ	370 U	370 U	380 U	52 J	400 U	370 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	11,000 UJ	2,800 J	11,000 UJ	380 UJ	380 UJ	60 J	47 J
CAPROLACTAM	µg/kg	350 U	370 U	370 U	380 UJ	380 U	400 U	99 J
CARBAZOLE	µg/kg	350 UJ	370 UJ	370 UJ	500 J	2,500	84 J	61 J
CHRYSENE	µg/kg	350 U	370 U	290 J	2,100	9,500	440	230 J
DIBENZ(A,H)ANTHRACENE	µg/kg	350 U	370 U	370 U	520	2,400 J	140 J	120 J
DIBENZOFURAN	µg/kg	350 UJ	370 U	69 J	190 J	630	400 U	370 U
DIETHYL PHTHALATE	µg/kg	350 UJ	370 U	370 U	380 U	380 U	400 U	370 U
DI-N-BUTYL PHTHALATE	µg/kg	350 U	370 U	370 U	380 U	380 U	44 J	370 U
DI-N-OCTYLPHTHALATE	µg/kg	21,000 J	73,000 J	24,000 J	380 UJ	380 UJ	400 UJ	370 UJ
FLUORANTHENE	µg/kg	350 U	370 U	150 J	4,100	20,000	740	460
FLUORENE	µg/kg	350 UJ	370 U	120 J	390	1,500	42 J	44 J
HEXACHLOROBENZENE	µg/kg	350 U	370 U	370 U	380 U	380 U	400 U	370 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	350 U	370 U	320 J	1,100	3,800	350 J	290 J
NAPHTHALENE	µg/kg	350 U	120 J	83 J	120 J	190 J	400 U	370 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	130 J	370 U	370 U	380 U	380 U	400 U	370 U
N-NITROSODIPHENYLAMINE	µg/kg	350 U	370 U	370 U	380 U	380 U	400 U	48 J
PHENANTHRENE	µg/kg	350 U	370 U	250 J	3,600	17,000	520	340 J
PHENOL	µg/kg	20,000	300 J	120 J	120 J	39 J	400 U	370 U
PYRENE	µg/kg	350 UJ	370 UJ	140 J	4,700	20,000	830	490

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

		SO-017	SO-017	SO-018	SO-018	SO-019	SO-021	SO-021
	Station:	SO-017	SO-017	SO-018	SO-018	SO-019	SO-021	SO-021
	Sample:	E2GX5	E2GX6	E2GX7	E2GX8	E2GX9	E2GL0	E2GL1
	Interval:	0 - 0.5	1.4 - 2	0 - 0.5	2.8 - 3.3	0 - 0.5	0 - 0.5	1 - 2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/1/2005	2/1/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
2-METHYLNAPHTHALENE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
3,3'-DICHLOROBENZIDINE	µg/kg	350 UJ	400 UJ	350 UJ	380 UJ	360 UJ	370 U	370 U
4-CHLORO-3-METHYLPHENOL	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
ACENAPHTHENE	µg/kg	210 J	400 U	350 U	380 UJ	360 U	370 U	370 U
ACENAPHTHYLENE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
ACETOPHENONE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
ANTHRACENE	µg/kg	460	45 J	54 J	3,800 U	360 U	370 U	370 U
BENZALDEHYDE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
BENZO(A)ANTHRACENE	µg/kg	1,800	81 J	81 J	1,600 J	360 U	370 U	39 J
BENZO(A)PYRENE	µg/kg	1,500	97 J	65 J	890 J	360 U	54 J	370 U
BENZO(B)FLUORANTHENE	µg/kg	1,200 J	72 J	350 U	3,800 U	40 J	73 J	45 J
BENZO(G,H,I)PERYLENE	µg/kg	2,200	83 J	88 J	3,800 U	140 J	44 J	370 U
BENZO(K)FLUORANTHENE	µg/kg	1,400	88 J	350 U	3,800 U	360 U	370 U	370 U
BENZYL BUTYL PHTHALATE	µg/kg	350 UJ	400 UJ	350 UJ	380 UJ	360 UJ	370 U	370 U
BIPHENYL (DIPHENYL)	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	40 J	400 UJ	350 UJ	3,800 UJ	46 J	370 U	58 J
CAPROLACTAM	µg/kg	350 U	400 U	350 U	210 J	360 U	370 U	370 U
CARBAZOLE	µg/kg	460	400 UJ	350 U	380 UJ	360 U	370 U	370 U
CHRYSENE	µg/kg	2,000	88 J	180 J	1,200	55 J	50 J	42 J
DIBENZ(A,H)ANTHRACENE	µg/kg	850	400 U	68 J	3,800 U	360 U	370 U	370 U
DIBENZOFURAN	µg/kg	120 J	400 U	350 U	380 UJ	360 U	370 U	370 U
DIETHYL PHTHALATE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
DI-N-BUTYL PHTHALATE	µg/kg	44 J	400 U	350 U	380 U	360 U	370 U	370 U
DI-N-OCTYLPHTHALATE	µg/kg	350 UJ	400 UJ	350 UJ	3,800 UJ	360 UJ	370 U	370 U
FLUORANTHENE	µg/kg	4,800	200 J	66 J	3,800 U	62 J	84 J	59 J
FLUORENE	µg/kg	170 J	400 U	350 U	3,800 U	360 U	370 U	370 U
HEXACHLOROBENZENE	µg/kg	350 U	400 U	350 U	380 U	360 U	370 U	370 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	1,700	72 J	80 J	3,800 U	81 J	54 J	370 U
NAPHTHALENE	µg/kg	80 J	400 U	350 U	380 UJ	360 U	370 U	370 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	350 U	400 U	350 U	380 UJ	360 U	370 U	370 U
N-NITROSODIPHENYLAMINE	µg/kg	350 U	400 U	350 U	380 U	360 U	370 U	370 U
PHENANTHRENE	µg/kg	3,200	200 J	110 J	3,800 U	360 U	370 U	40 J
PHENOL	µg/kg	350 U	400 U	350 U	3,800 U	360 U	370 U	370 U
PYRENE	µg/kg	5,900	160 J	110 J	1,100 J	58 J	82 J	68 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-023	SO-023	SO-024	SO-025	SO-026	SO-026	SO-026
	Sample:	E2GL4	E2GL5	E2GL6	E2GM8	E2GP8	E2GP9	E2GQ0
	Interval:	0 - 0.5	1.5 - 2.5	0 - 0.5	0 - 0.5	0 - 0.5	1 - 2	1 - 2
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil, dup
	Date:	2/1/2005	2/1/2005	2/1/2005	2/2/2005	2/7/2005	2/7/2005	2/7/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
2-METHYLNAPHTHALENE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
3,3'-DICHLOROBENZIDINE	µg/kg	10,000 U	390 U	360 U	10,000 U	81 J	360 UJ	360 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 UJ
4-METHYLPHENOL (P-CRESOL)	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 UJ
ACENAPHTHENE	µg/kg	10,000 U	390 U	360 U	2,000 J	360 U	360 U	360 U
ACENAPHTHYLENE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
ACETOPHENONE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 UJ
ANTHRACENE	µg/kg	10,000 U	390 U	360 U	3,700 J	360 U	360 U	360 U
BENZALDEHYDE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
BENZO(A)ANTHRACENE	µg/kg	1,400 J	58 J	50 J	4,600 J	360 U	81 J	61 J
BENZO(A)PYRENE	µg/kg	1,700 J	67 J	48 J	3,000 J	360 U	100 J	76 J
BENZO(B)FLUORANTHENE	µg/kg	2,000 J	94 J	74 J	4,000 J	360 U	91 J	100 J
BENZO(G,H,I)PERYLENE	µg/kg	1,000 J	50 J	360 U	10,000 U	360 U	58 J	71 J
BENZO(K)FLUORANTHENE	µg/kg	10,000 U	390 U	360 U	1,600 J	360 U	58 J	77 J
BENZYL BUTYL PHTHALATE	µg/kg	10,000 U	390 U	360 U	10,000 UJ	360 U	360 U	360 UJ
BIPHENYL (DIPHENYL)	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	10,000 U	390 U	360 U	10,000 U	51 J	360 U	360 UJ
CAPROLACTAM	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 UJ
CARBAZOLE	µg/kg	10,000 U	390 U	360 U	2,200 J	360 U	360 U	360 UJ
CHRYSENE	µg/kg	2,200 J	73 J	69 J	5,300 J	36 J	88 J	78 J
DIBENZ(A,H)ANTHRACENE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	41 J
DIBENZOFURAN	µg/kg	10,000 U	390 U	360 U	1,500 J	360 U	360 U	360 U
DIETHYL PHTHALATE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
DI-N-BUTYL PHTHALATE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
DI-N-OCTYLPHTHALATE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 UJ
FLUORANTHENE	µg/kg	7,300 J	100 J	140 J	16,000	360 U	150 J	110 J
FLUORENE	µg/kg	10,000 U	390 U	360 U	1,900 J	360 U	360 U	360 U
HEXACHLOROBENZENE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	1,300 J	56 J	50 J	10,000 U	360 U	50 J	57 J
NAPHTHALENE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
N-NITROSODIPHENYLAMINE	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
PHENANTHRENE	µg/kg	5,600 J	63 J	95 J	28,000	360 U	360 U	360 U
PHENOL	µg/kg	10,000 U	390 U	360 U	10,000 U	360 U	360 U	360 U
PYRENE	µg/kg	5,900 J	100 J	120 J	15,000 J	360 U	110 J	95 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-028	SO-028	SO-029	SO-030	SO-030	SO-030	SO-031
	Sample:	E2GM0	E2GM1	E2GM3	E2GY1	E2GY2	E2GY3	E2GQ1
	Interval:	0 - 0.5	1.5 - 2.5	1.5 - 2.5	0 - 0.5	2 - 3	2 - 3	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil
	Date:	2/1/2005	2/1/2005	2/1/2005	2/17/2005	2/17/2005	2/17/2005	2/7/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
2-METHYLNAPHTHALENE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
3,3'-DICHLOROBENZIDINE	µg/kg	10,000 U	390 U	390 U	350 UJ	390 UJ	390 UJ	350 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	10,000 UJ	390 U	390 U	350 U	390 U	390 U	350 UJ
4-METHYLPHENOL (P-CRESOL)	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 UJ
ACENAPHTHENE	µg/kg	10,000 UJ	240 J	390 U	350 U	130 J	210 J	350 U
ACENAPHTHYLENE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
ACETOPHENONE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 UJ
ANTHRACENE	µg/kg	10,000 U	950	390 U	60 J	160 J	480	350 U
BENZALDEHYDE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
BENZO(A)ANTHRACENE	µg/kg	10,000 U	1,800	70 J	260 J	730	1,000 J	48 J
BENZO(A)PYRENE	µg/kg	10,000 U	1,700	75 J	290 J	390	1,400	50 J
BENZO(B)FLUORANTHENE	µg/kg	10,000 U	1,800	90 J	350 J	490	1,000	51 J
BENZO(G,H,I)PERYLENE	µg/kg	10,000 U	820	390 U	190 J	630	610	36 J
BENZO(K)FLUORANTHENE	µg/kg	10,000 U	570	390 U	210 J	460	920 J	53 J
BENZYL BUTYL PHTHALATE	µg/kg	10,000 UJ	390 UJ	390 UJ	350 UJ	390 UJ	390 UJ	350 UJ
BIPHENYL (DIPHENYL)	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	3,100 J	390 U	390 U	36 J	390 UJ	390 UJ	350 UJ
CAPROLACTAM	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 UJ
CARBAZOLE	µg/kg	10,000 U	380 J	390 U	68 J	86 J	190 J	350 UJ
CHRYSENE	µg/kg	10,000 U	1,700	79 J	380	710	1,200	52 J
DIBENZ(A,H)ANTHRACENE	µg/kg	10,000 U	390 U	390 U	95 J	350 J	340 J	350 U
DIBENZOFURAN	µg/kg	10,000 U	120 J	390 U	350 U	46 J	100 J	350 U
DIETHYL PHTHALATE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
DI-N-BUTYL PHTHALATE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	40 J	350 U
DI-N-OCTYLPHTHALATE	µg/kg	10,000 U	390 U	390 U	350 UJ	390 UJ	390 UJ	350 UJ
FLUORANTHENE	µg/kg	10,000 U	4,500	100 J	880	1,000	3,000	91 J
FLUORENE	µg/kg	10,000 U	310 J	390 U	350 U	50 J	140 J	350 U
HEXACHLOROBENZENE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	10,000 U	1,100	390 U	240 J	540	820	38 J
NAPHTHALENE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
N-NITROSODIPHENYLAMINE	µg/kg	10,000 U	390 U	390 U	350 U	390 U	390 U	350 U
PHENANTHRENE	µg/kg	10,000 U	3,300	73 J	570	480	1,700	66 J
PHENOL	µg/kg	10,000 UJ	390 U	390 U	350 U	390 U	390 U	350 U
PYRENE	µg/kg	10,000 UJ	3,700 J	110 J	750 J	1,600	2,300 J	97 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-031	SO-032	SO-032	SO-033	SO-033	SO-034	SO-034
	Sample:	E2GQ2	E2GS5	E2GS6	E2GS7	E2GS8	E2GS9	E2GT0
	Interval:	1.5 - 2.5	0 - 0.5	14 - 1.6	0 - 0.5	2.4 - 2.6	0 - 0.5	2 - 3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/7/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005	2/9/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	360 U	3,800 U	410 UJ	370 U	380 U	380 U	390 U
2-METHYLNAPHTHALENE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	86 J	390 U
3,3'-DICHLOROBENZIDINE	µg/kg	360 UJ	3,800 UJ	410 UJ	370 UJ	380 UJ	380 UJ	390 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
ACENAPHTHENE	µg/kg	360 U	1,900 J	410 U	42 J	380 U	66 J	390 U
ACENAPHTHYLENE	µg/kg	15 J	510 J	410 U	370 U	380 U	530	390 U
ACETOPHENONE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
ANTHRACENE	µg/kg	360 U	5,900	410 U	65 J	380 U	2,700	390 U
BENZALDEHYDE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
BENZO(A)ANTHRACENE	µg/kg	77 J	13,000	90 J	220 J	380 U	1,900	390 U
BENZO(A)PYRENE	µg/kg	130 J	18,000	120 J	230 J	55 J	1,400	390 U
BENZO(B)FLUORANTHENE	µg/kg	110 J	27,000 J	110 J	240 J	56 J	1,400	390 U
BENZO(G,H,I)PERYLENE	µg/kg	150 J	14,000	250 J	170 J	130 J	920 J	390 UJ
BENZO(K)FLUORANTHENE	µg/kg	120 J	15,000	120 J	240 J	380 U	1,400	390 U
BENZYL BUTYL PHTHALATE	µg/kg	360 UJ	3,800 UJ	410 UJ	370 UJ	380 UJ	380 UJ	390 UJ
BIPHENYL (DIPHENYL)	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	360 UJ	3,800 UJ	120 J	370 UJ	68 J	99 J	47 J
CAPROLACTAM	µg/kg	360 U	3,800 U	410 UJ	370 U	380 U	380 U	390 U
CARBAZOLE	µg/kg	360 U	4,900	410 UJ	65 J	380 U	1,400	390 U
CHRYSENE	µg/kg	120 J	51,000	150 J	340 J	51 J	2,300	390 U
DIBENZ(A,H)ANTHRACENE	µg/kg	53 J	12,000	54 J	97 J	380 U	480	390 U
DIBENZOFURAN	µg/kg	360 U	1,000 J	410 U	370 U	380 U	440	390 U
DIETHYL PHTHALATE	µg/kg	360 U	3,800 U	49 J	370 U	380 U	380 U	390 U
DI-N-BUTYL PHTHALATE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
DI-N-OCTYLPHTHALATE	µg/kg	360 UJ	3,800 UJ	410 UJ	370 UJ	380 UJ	380 UJ	390 UJ
FLUORANTHENE	µg/kg	110 J	42,000	190 J	660	57 J	4,300	390 U
FLUORENE	µg/kg	360 U	2,200 J	410 U	370 U	380 U	1,200	390 U
HEXACHLOROBENZENE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	130 J	24,000	96 J	210 J	67 J	890	390 U
NAPHTHALENE	µg/kg	360 U	390 J	410 U	370 U	380 U	110 J	390 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
N-NITROSODIPHENYLAMINE	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
PHENANTHRENE	µg/kg	78 J	16,000	81 J	400	380 U	5,200	390 U
PHENOL	µg/kg	360 U	3,800 U	410 U	370 U	380 U	380 U	390 U
PYRENE	µg/kg	150 J	31,000	190 J	520	68 J	3,700	390 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-035	SO-035	SO-036	SO-036	SO-037	SO-037	SO-038
	Sample:	E2GQ3	E2GQ4	E2GQ5	E2GQ6	E2GS0	E2GS1	E2GQ7
	Interval:	0 - 0.5	1 - 2	0 - 0.5	1 - 2	0 - 0.5	1 - 2	0 - 0.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/9/2005	2/9/2005	2/8/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	6,700 U	350 U	6,700 U	350 U	340 UJ	350 UJ	350 U
2-METHYLNAPHTHALENE	µg/kg	3,000 J	350 U	900 J	350 U	340 U	350 U	350 U
3,3'-DICHLOROBENZIDINE	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 UJ	350 UJ	350 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 U	350 U	350 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 U	350 U	350 U
ACENAPHTHENE	µg/kg	19,000	270 J	4,200 J	350 U	340 U	350 U	59 J
ACENAPHTHYLENE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
ACETOPHENONE	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 U	350 U	350 U
ANTHRACENE	µg/kg	17,000	490	6,200 J	350 U	67 J	350 U	130 J
BENZALDEHYDE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
BENZO(A)ANTHRACENE	µg/kg	47,000	1,400	11,000	93 J	280 J	350 U	640
BENZO(A)PYRENE	µg/kg	40,000	1,500	11,000 J	100 J	310 J	350 U	1,000
BENZO(B)FLUORANTHENE	µg/kg	51,000	1,700 J	16,000	120 J	300 J	350 U	1,000
BENZO(G,H,I)PERYLENE	µg/kg	32,000 J	860	7,600	89 J	280 J	230 J	820
BENZO(K)FLUORANTHENE	µg/kg	29,000	1,000	9,700	120 J	340 J	350 UJ	870
BENZYL BUTYL PHTHALATE	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 UJ	350 UJ	350 U
BIPHENYL (DIPHENYL)	µg/kg	1,500 J	350 U	6,700 U	350 U	340 U	350 U	350 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	52 J	50 J	63 J
CAPROLACTAM	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 UJ	350 UJ	350 U
CARBAZOLE	µg/kg	17,000 J	400 J	5,700 J	350 UJ	48 J	350 UJ	110 J
CHRYSENE	µg/kg	63,000	2,000	15,000	97 J	400	350 U	960
DIBENZ(A,H)ANTHRACENE	µg/kg	13,000	370	4,500 J	42 J	100 J	350 U	320 J
DIBENZOFURAN	µg/kg	16,000	130 J	3,200 J	350 U	340 U	350 U	350 U
DIETHYL PHTHALATE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
DI-N-BUTYL PHTHALATE	µg/kg	62 J	350 U	6,700 U	350 U	340 U	350 U	350 U
DI-N-OCTYLPHTHALATE	µg/kg	6,700 UJ	350 UJ	6,700 UJ	350 UJ	340 UJ	350 UJ	350 U
FLUORANTHENE	µg/kg	150,000	4,900	41,000	150 J	900	350 U	1,900
FLUORENE	µg/kg	17,000	240 J	3,400 J	350 U	340 U	350 U	49 J
HEXACHLOROBENZENE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	27,000	830	8,300	77 J	220 J	350 U	730
NAPHTHALENE	µg/kg	5,100 J	84 J	1,300 J	350 U	340 U	350 U	350 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
N-NITROSODIPHENYLAMINE	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 U	350 U
PHENANTHRENE	µg/kg	200,000	3,500	47,000	100 J	410	350 U	1,000
PHENOL	µg/kg	6,700 U	350 U	6,700 U	350 U	340 U	350 UJ	350 U
PYRENE	µg/kg	140,000 J	4,600	30,000	130 J	730	350 U	1,800

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

		SO-038	SO-039	SO-039	SO-040	SO-040	SO-041	SO-041
	Station:	SO-038	SO-039	SO-039	SO-040	SO-040	SO-041	SO-041
	Sample:	E2GQ8	E2GQ9	E2GR0	E2GR1	E2GR2	E2GR3	E2GR4
	Interval:	1 - 2	0 - 0.5	0.6 - 1.3	0 - 0.5	1.5 - 2	0 - 0.5	1.4 - 2.4
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005	2/8/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	350 U	1,700 U	360 UJ	370 UJ	350 U	390 UJ	370 UJ
2-METHYLNAPHTHALENE	µg/kg	350 U	300 J	360 U	370 U	350 U	87 J	370 U
3,3'-DICHLOROBENZIDINE	µg/kg	350 UJ	1,700 UJ	360 UJ	370 UJ	350 UJ	390 UJ	370 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	350 UJ	1,700 U	360 U	370 U	350 UJ	390 U	370 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	350 UJ	1,700 U	360 U	370 U	350 UJ	390 U	370 U
ACENAPHTHENE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	2,000	370 U
ACENAPHTHYLENE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	100 J	370 U
ACETOPHENONE	µg/kg	350 UJ	1,700 U	360 U	370 U	350 UJ	170 J	370 U
ANTHRACENE	µg/kg	350 U	1,700 U	53 J	17 J	350 U	4,300 J	370 U
BENZALDEHYDE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	45 J	370 U
BENZO(A)ANTHRACENE	µg/kg	350 U	290 J	110 J	110 J	350 U	17,000	370 U
BENZO(A)PYRENE	µg/kg	350 U	240 J	160 J	130 J	350 U	20,000	370 U
BENZO(B)FLUORANTHENE	µg/kg	350 U	250 J	84 J	130 J	350 U	18,000	370 U
BENZO(G,H,I)PERYLENE	µg/kg	350 U	1,700 UJ	360 U	370 U	350 U	11,000 J	370 U
BENZO(K)FLUORANTHENE	µg/kg	350 U	200 J	130 J	100 J	350 U	21,000	370 UJ
BENZYL BUTYL PHTHALATE	µg/kg	350 UJ	1,700 UJ	360 UJ	370 UJ	350 UJ	390 UJ	370 UJ
BIPHENYL (DIPHENYL)	µg/kg	350 U	1,700 U	360 U	370 U	350 U	51 J	370 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	350 UJ	1,700 UJ	50 J	370 UJ	350 UJ	62 J	370 UJ
CAPROLACTAM	µg/kg	350 UJ	1,700 U	360 UJ	370 UJ	350 UJ	390 UJ	370 UJ
CARBAZOLE	µg/kg	350 UJ	1,700 U	39 J	370 UJ	350 UJ	2,300 J	370 UJ
CHRYSENE	µg/kg	350 U	460 J	130 J	150 J	350 U	24,000	370 U
DIBENZ(A,H)ANTHRACENE	µg/kg	350 U	1,700 U	43 J	39 J	350 U	6,500 J	370 U
DIBENZOFURAN	µg/kg	350 U	1,700 U	360 U	370 U	350 U	550	370 U
DIETHYL PHTHALATE	µg/kg	350 U	1,700 U	360 U	370 U	140 J	390 U	370 U
DI-N-BUTYL PHTHALATE	µg/kg	350 U	1,700 U	360 U	43 J	63 J	48 J	370 U
DI-N-OCTYLPHTHALATE	µg/kg	350 UJ	1,700 UJ	360 UJ	370 UJ	350 UJ	390 UJ	370 UJ
FLUORANTHENE	µg/kg	41 J	900 J	390	270 J	350 U	45,000	40 J
FLUORENE	µg/kg	350 U	1,700 U	59 J	370 U	350 U	1,500	370 U
HEXACHLOROBENZENE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	390 U	370 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	40 J	320 J	89 J	87 J	350 U	13,000 J	370 U
NAPHTHALENE	µg/kg	350 U	1,700 U	240 J	370 U	350 U	190 J	370 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	390 U	370 U
N-NITROSODIPHENYLAMINE	µg/kg	350 U	1,700 U	360 U	370 U	350 U	390 U	370 U
PHENANTHRENE	µg/kg	350 U	880 J	330 J	100 J	350 U	20,000	370 U
PHENOL	µg/kg	350 U	1,700 U	360 U	370 U	350 U	43 J	370 U
PYRENE	µg/kg	54 J	930 J	280 J	230 J	350 U	45,000	370 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-041	SO-042	SO-042	SO-043	SO-043	SO-045	SO-050
	Sample:	E2GR5	E2GR6	E2GR7	E2GS2	E2GS3	E2GN2	E2GY4
	Interval:	1.4 - 2.4	0 - 0.5	1.5 - 2.5	0 - 0.5	2.8 - 3	1.5 - 2.5	0 - 0.5
	Matrix:	Soil, dup	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/8/2005	2/8/2005	2/8/2005	2/9/2005	2/9/2005	2/2/2005	2/17/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	370 UJ	380 UJ	390 UJ	380 U	400 U	380 U	460 U
2-METHYLNAPHTHALENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	51 J
3,3'-DICHLOROBENZIDINE	µg/kg	370 UJ	380 UJ	390 UJ	380 UJ	400 UJ	380 U	460 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
ACENAPHTHENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	550
ACENAPHTHYLENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	63 J
ACETOPHENONE	µg/kg	370 U	52 J	46 J	380 U	62 J	380 U	120 J
ANTHRACENE	µg/kg	370 U	91 J	390 U	380 U	400 U	380 U	1,300
BENZALDEHYDE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
BENZO(A)ANTHRACENE	µg/kg	370 U	470	390 U	98 J	400 U	77 J	5,400
BENZO(A)PYRENE	µg/kg	370 U	550	390 U	88 J	400 U	98 J	5,100
BENZO(B)FLUORANTHENE	µg/kg	370 U	400	390 U	93 J	400 U	110 J	6,600
BENZO(G,H,I)PERYLENE	µg/kg	370 U	390	390 U	76 J	400 UJ	380 U	2,600 J
BENZO(K)FLUORANTHENE	µg/kg	370 UJ	640 J	390 UJ	110 J	400 U	53 J	5,100
BENZYL BUTYL PHTHALATE	µg/kg	370 UJ	380 UJ	390 UJ	380 UJ	400 UJ	380 UJ	460 UJ
BIPHENYL (DIPHENYL)	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	38 J	64 J	390 UJ	39 J	50 J	380 U	230 J
CAPROLACTAM	µg/kg	370 UJ	380 UJ	390 UJ	380 U	400 U	380 U	460 U
CARBAZOLE	µg/kg	370 UJ	63 J	390 UJ	380 U	400 U	380 U	1,200
CHRYSENE	µg/kg	370 U	620	390 U	130 J	400 U	58 J	5,900
DIBENZ(A,H)ANTHRACENE	µg/kg	370 U	150 J	390 U	44 J	400 U	380 U	1,800
DIBENZOFURAN	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	280 J
DIETHYL PHTHALATE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
DI-N-BUTYL PHTHALATE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	390 J
DI-N-OCTYLPHTHALATE	µg/kg	370 UJ	380 UJ	390 UJ	380 UJ	400 UJ	380 U	460 UJ
FLUORANTHENE	µg/kg	370 U	1,300	390 U	210 J	400 U	49 J	16,000
FLUORENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	570 J
HEXACHLOROBENZENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	230 J
INDENO(1,2,3-C,D)PYRENE	µg/kg	370 U	360 J	390 U	77 J	400 U	86 J	3,500
NAPHTHALENE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
N-NITROSODIPHENYLAMINE	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
PHENANTHRENE	µg/kg	370 U	510	390 U	130 J	400 U	380 U	9,300
PHENOL	µg/kg	370 U	380 U	390 U	380 U	400 U	380 U	460 U
PYRENE	µg/kg	370 U	1,000	390 U	220 J	40 J	75 J	14,000

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-050	SO-051	SO-051	SO-052	SO-052	SO-053	SO-053
	Sample:	E2GY5	E2GY6	E2GY7	E2GY8	E2GY9	E2GZ0	E2GZ1
	Interval:	1 - 1.8	0 - 0.5	1.4 - 3	0 - 0.5	0.5 - 1.3	0 - 0.5	2.3 - 3.8
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005	2/17/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
2-METHYLNAPHTHALENE	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
3,3'-DICHLOROBENZIDINE	µg/kg	390 UJ	460 UJ	360 UJ	440 UJ	390 UJ	460 UJ	350 UJ
4-CHLORO-3-METHYLPHENOL	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	390 U	460 U	360 U	440 U	390 U	460 UJ	350 UJ
ACENAPHTHENE	µg/kg	390 U	160 J	360 U	100 J	390 U	460 U	350 U
ACENAPHTHYLENE	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
ACETOPHENONE	µg/kg	390 U	49 J	360 U	49 J	390 U	61 J	350 U
ANTHRACENE	µg/kg	390 U	240 J	360 U	220 J	390 U	51 J	350 U
BENZALDEHYDE	µg/kg	390 U	460 U	360 U	440 U	390 U	460 UJ	350 UJ
BENZO(A)ANTHRACENE	µg/kg	52 J	780	360 U	710	390 U	190 J	350 U
BENZO(A)PYRENE	µg/kg	48 J	750	360 U	540 J	390 U	230 J	350 U
BENZO(B)FLUORANTHENE	µg/kg	60 J	730	360 U	610	390 U	340 J	51 J
BENZO(G,H,I)PERYLENE	µg/kg	100 J	430 J	360 U	550	390 U	120 J	350 UJ
BENZO(K)FLUORANTHENE	µg/kg	45 J	590	360 U	560	390 U	200 J	350 U
BENZYL BUTYL PHTHALATE	µg/kg	390 UJ	460 UJ	360 UJ	440 UJ	390 UJ	460 U	350 U
BIPHENYL (DIPHENYL)	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	45 J	51 J	360 UJ	83 J	50 J	460 U	350 U
CAPROLACTAM	µg/kg	41 J	460 U	360 U	55 J	390 U	460 U	350 U
CARBAZOLE	µg/kg	390 U	340 J	360 U	160 J	390 U	460 U	350 U
CHRYSENE	µg/kg	71 J	1,100	360 U	820	390 U	230 J	42 J
DIBENZ(A,H)ANTHRACENE	µg/kg	390 U	330 J	360 U	260 J	390 U	96 J	350 U
DIBENZOFURAN	µg/kg	390 U	92 J	360 U	70 J	390 U	460 U	350 U
DIETHYL PHTHALATE	µg/kg	290 J	460 U	360 U	440 U	390 U	460 U	350 U
DI-N-BUTYL PHTHALATE	µg/kg	390 U	95 J	62 J	98 J	87 J	460 U	350 U
DI-N-OCTYLPHTHALATE	µg/kg	390 UJ	460 UJ	360 UJ	440 UJ	390 UJ	460 UJ	350 UJ
FLUORANTHENE	µg/kg	100 J	2,300	360 U	2,000	390 U	440 J	52 J
FLUORENE	µg/kg	390 U	180 J	360 U	100 J	390 U	460 U	350 U
HEXACHLOROBENZENE	µg/kg	390 U	460 U	360 U	59 J	390 U	460 U	350 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	89 J	610	360 U	440	390 U	180 J	350 U
NAPHTHALENE	µg/kg	390 U	62 J	360 U	440 U	390 U	460 U	350 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	390 U	460 U	360 U	440 U	390 U	460 UJ	350 UJ
N-NITROSODIPHENYLAMINE	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
PHENANTHRENE	µg/kg	78 J	2,000	360 U	1,300	390 U	290 J	350 U
PHENOL	µg/kg	390 U	460 U	360 U	440 U	390 U	460 U	350 U
PYRENE	µg/kg	130 J	2,400	360 U	2,000	390 U	640	59 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-053	SO-054	SO-062	SO-062	SO-064	SO-064	SO-067
	Sample:	E2GZ2	E2GZ3	E2HD6	E2HD7	E2HD9	E2HE0	E2HE3
	Interval:	2.3 - 3.8	0 - 0.5	0.8 - 2.3	4 - 4.5	0 - 1	4 - 6.6	6 - 6.5
	Matrix:	Soil, dup	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	2/17/2005	2/17/2005	3/15/2005	3/15/2005	3/16/2005	3/16/2005	3/17/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
2-METHYLNAPHTHALENE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
3,3'-DICHLOROBENZIDINE	µg/kg	350 UJ	460 UJ	11,000	3,800	2,000	2,000	380
4-CHLORO-3-METHYLPHENOL	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
4-METHYLPHENOL (P-CRESOL)	µg/kg	350 UJ	460 UJ	11,000	3,800	2,000	2,000	380
ACENAPHTHENE	µg/kg	350 U	280 J	11,000	3,800	990	5,600	380
ACENAPHTHYLENE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
ACETOPHENONE	µg/kg	350 U	130 J	11,000	3,800	2,000	2,000	380
ANTHRACENE	µg/kg	350 U	440 J	11,000	3,800	1,600	2,200	380
BENZALDEHYDE	µg/kg	350 UJ	460 UJ	11,000	3,800	2,000	2,000	380
BENZO(A)ANTHRACENE	µg/kg	25 J	1,500	11,000	3,800	7,100	6,500	100
BENZO(A)PYRENE	µg/kg	27 J	1,600	11,000	3,800	5,300	3,300	120
BENZO(B)FLUORANTHENE	µg/kg	41 J	1,400	11,000	3,800	6,100	4,600	170
BENZO(G,H,I)PERYLENE	µg/kg	350 UJ	650 J	11,000	3,800	3,700	2,000	120
BENZO(K)FLUORANTHENE	µg/kg	38 J	1,500	11,000	3,800	5,500	3,400	92
BENZYL BUTYL PHTHALATE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
BIPHENYL (DIPHENYL)	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	350 U	83 J	11,000	3,800	2,000	2,000	380
CAPROLACTAM	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
CARBAZOLE	µg/kg	350 U	470	11,000	3,800	1,100	2,000	380
CHRYSENE	µg/kg	40 J	2,400	4,100	3,800	7,800	8,200	160
DIBENZ(A,H)ANTHRACENE	µg/kg	350 U	460	11,000	3,800	1,700	900	380
DIBENZOFURAN	µg/kg	350 U	140 J	11,000	3,800	680	740	380
DIETHYL PHTHALATE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
DI-N-BUTYL PHTHALATE	µg/kg	350 U	460 UJ	11,000	3,800	2,000	2,000	380
DI-N-OCTYLPHTHALATE	µg/kg	350 UJ	460 UJ	11,000	3,800	2,000	2,000	380
FLUORANTHENE	µg/kg	57 J	3,400	11,000	3,800	17,000	27,000	160
FLUORENE	µg/kg	350 U	280 J	11,000	3,800	1,300	6,500	380
HEXACHLOROBENZENE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
INDENO(1,2,3-C,D)PYRENE	µg/kg	350 U	1,000	11,000	3,800	2,800	1,600	96
NAPHTHALENE	µg/kg	350 U	78 J	11,000	3,800	2,000	2,000	380
N-NITROSODI-N-PROPYLAMINE	µg/kg	350 UJ	460 UJ	11,000	3,800	2,000	2,000	380
N-NITROSODIPHENYLAMINE	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
PHENANTHRENE	µg/kg	350 U	3,000	11,000	3,800	11,000	2,000	88
PHENOL	µg/kg	350 U	460 U	11,000	3,800	2,000	2,000	380
PYRENE	µg/kg	64 J	3,200	2,100	420	16,000	25,000	180

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-067	SO-070	SO-071	SO-074	SO-074	SO-081	SO-081
	Sample:	E2HE4	E2HF0	E2HF2	E2HF6	E2HF7	E2HG2	E2HG3
	Interval:	6 - 6.5	3.3 - 4.5	4 - 5	0.4 - 0.8	2.1 - 2.4	4 - 4.9	8 - 8.7
	Matrix:	Soil, dup	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/17/2005	3/22/2005	3/22/2005	3/24/2005	3/24/2005	3/30/2005	3/30/2005
Semivolatile Organical Compounds								
2,4-DIMETHYLPHENOL	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
2-METHYLNAPHTHALENE	µg/kg	390	350	340	10,000	230	11,000 U	11,000 U
3,3'-DICHLOROBENZIDINE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
4-CHLORO-3-METHYLPHENOL	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
ACENAPHTHENE	µg/kg	390	350	340	2,400	460	11,000 U	11,000 U
ACENAPHTHYLENE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
ACETOPHENONE	µg/kg	390	52	340	10,000	460	11,000 U	11,000 U
ANTHRACENE	µg/kg	390	350	340	10,000	83	11,000 U	11,000 U
BENZALDEHYDE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
BENZO(A)ANTHRACENE	µg/kg	100	110	34	14,000	120	11,000 U	11,000 U
BENZO(A)PYRENE	µg/kg	140	86	340	11,000	82	11,000 U	11,000 U
BENZO(B)FLUORANTHENE	µg/kg	100	77	340	7,400	460	11,000 U	11,000 U
BENZO(G,H,I)PERYLENE	µg/kg	93	59	340	5,200	80	11,000 U	11,000 U
BENZO(K)FLUORANTHENE	µg/kg	77	87	340	10,000	460	11,000 U	11,000 U
BENZYL BUTYL PHTHALATE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
BIPHENYL (DIPHENYL)	µg/kg	390	350	340	10,000	59	11,000 U	11,000 U
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
CAPROLACTAM	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
CARBAZOLE	µg/kg	390	350	340	3,000	66	11,000 U	11,000 U
CHRYSENE	µg/kg	130	140	38	15,000	170	1,100 J	11,000 U
DIBENZ(A,H)ANTHRACENE	µg/kg	390	350	340	3,700	460	11,000 U	11,000 U
DIBENZOFURAN	µg/kg	390	350	340	2,300	140	11,000 U	11,000 U
DIETHYL PHTHALATE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
DI-N-BUTYL PHTHALATE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
DI-N-OCTYLPHTHALATE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
FLUORANTHENE	µg/kg	140	170	62	42,000	260	1,500 J	11,000 U
FLUORENE	µg/kg	390	350	340	4,400	460	11,000 U	11,000 U
HEXACHLOROBENZENE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	70	51	340	6,900	460	11,000 U	11,000 U
NAPHTHALENE	µg/kg	390	350	340	10,000	73	11,000 U	11,000 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
N-NITROSODIPHENYLAMINE	µg/kg	390	350	340	10,000	250	11,000 U	11,000 U
PHENANTHRENE	µg/kg	66	120	38	35,000	1,300	1,400 J	1,900 J
PHENOL	µg/kg	390	350	340	10,000	460	11,000 U	11,000 U
PYRENE	µg/kg	170	250	91	33,000	270	1,500 J	1,500 J

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-3
Appendix C
OMC Soil
Semivolatile Organic Compounds

	Station:	SO-081	SO-081	SO-081
	Sample:	E2HG4	E2HG7	E2HG8
	Interval:	8 - 8.7	25 - 26.9	25 - 26.9
	Matrix:	Soil, dup	Soil	Soil, dup
	Date:	3/30/2005	3/31/2005	3/31/2005
Semivolatile Organical Compounds				
2,4-DIMETHYLPHENOL	µg/kg	21,000 U	340 U	410 U
2-METHYLNAPHTHALENE	µg/kg	21,000 U	130 J	210 J
3,3'-DICHLOROBENZIDINE	µg/kg	21,000 U	340 U	410 U
4-CHLORO-3-METHYLPHENOL	µg/kg	21,000 U	340 U	410 U
4-METHYLPHENOL (P-CRESOL)	µg/kg	21,000 U	340 UJ	410 U
ACENAPHTHENE	µg/kg	21,000 U	340 U	410 U
ACENAPHTHYLENE	µg/kg	21,000 U	340 U	410 U
ACETOPHENONE	µg/kg	21,000 U	340 UJ	410 U
ANTHRACENE	µg/kg	21,000 U	340 U	410 U
BENZALDEHYDE	µg/kg	21,000 U	340 UJ	410 U
BENZO(A)ANTHRACENE	µg/kg	21,000 U	340 U	410 U
BENZO(A)PYRENE	µg/kg	21,000 U	340 U	410 U
BENZO(B)FLUORANTHENE	µg/kg	21,000 U	340 U	410 U
BENZO(G,H,I)PERYLENE	µg/kg	21,000 U	340 U	410 U
BENZO(K)FLUORANTHENE	µg/kg	21,000 U	340 U	410 U
BENZYL BUTYL PHTHALATE	µg/kg	21,000 U	340 U	410 U
BIPHENYL (DIPHENYL)	µg/kg	21,000 U	60 J	86 J
BIS(2-ETHYLHEXYL) PHTHALATE	µg/kg	21,000 U	340 U	410 U
CAPROLACTAM	µg/kg	21,000 U	340 U	410 U
CARBAZOLE	µg/kg	21,000 U	340 U	410 U
CHRYSENE	µg/kg	21,000 U	340 U	410 U
DIBENZ(A,H)ANTHRACENE	µg/kg	21,000 U	340 U	410 U
DIBENZOFURAN	µg/kg	21,000 U	340 U	410 U
DIETHYL PHTHALATE	µg/kg	21,000 U	340 U	410 U
DI-N-BUTYL PHTHALATE	µg/kg	21,000 U	340 U	410 U
DI-N-OCTYLPHTHALATE	µg/kg	21,000 U	340 U	410 U
FLUORANTHENE	µg/kg	21,000 U	340 U	410 U
FLUORENE	µg/kg	21,000 U	340 U	410 U
HEXACHLOROBENZENE	µg/kg	21,000 U	340 U	410 U
INDENO(1,2,3-C,D)PYRENE	µg/kg	21,000 U	340 U	410 U
NAPHTHALENE	µg/kg	21,000 U	340 U	410 U
N-NITROSODI-N-PROPYLAMINE	µg/kg	21,000 U	340 UJ	410 U
N-NITROSODIPHENYLAMINE	µg/kg	21,000 U	340 U	410 U
PHENANTHRENE	µg/kg	5,200 J	610	830
PHENOL	µg/kg	21,000 U	340 UJ	410 U
PYRENE	µg/kg	4,400 J	340 U	410 U

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-4
Appendix C
OMC Soil
Pesticides

	Station:	SO-074	SO-074	SO-074
	Sample:	E2HF6	E2HF7	E2HF8
	Interval:	0.4 - 0.8	2.1 - 2.4	22 - 22.9
	Matrix:	Soil	Soil	Soil
	Date:	3/24/2005	3/24/2005	3/24/2005
Pesticides				
ALDRIN	µg/kg	1.8	2.4	2.1
ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE)	µg/kg	1.8	2.4	2.1
ALPHA ENDOSULFAN	µg/kg	1.8	2.8	2.1
ALPHA-CHLORDANE	µg/kg	1.8	2.4	2.1
BETA BHC (BETA HEXACHLOROCYCLOHEXANE)	µg/kg	1.8	2.4	2.1
BETA ENDOSULFAN	µg/kg	1.3	4.6	4
DELTA BHC (DELTA HEXACHLOROCYCLOHEXANE)	µg/kg	1.8	2.4	2.1
DIELDRIN	µg/kg	3.4	4.6	4
ENDOSULFAN SULFATE	µg/kg	3.4	4.6	4
ENDRIN	µg/kg	1.8	1.5	4
ENDRIN ALDEHYDE	µg/kg	3.4	2	4
ENDRIN KETONE	µg/kg	1.3	1.8	0.28
GAMMA BHC (LINDANE)	µg/kg	1.8	1.5	2.1
GAMMA-CHLORDANE	µg/kg	1.8	2.4	2.1
HEPTACHLOR	µg/kg	1.8	2.4	2.1
HEPTACHLOR EPOXIDE	µg/kg	1.8	2.4	2.1
METHOXYCHLOR	µg/kg	3.2	1.8	20
P,P'-DDD	µg/kg	3.4	4.6	4
P,P'-DDE	µg/kg	13	12	4
P,P'-DDT	µg/kg	17	9.9	4
TOXAPHENE	µg/kg	180	240	200

Table 2-5
Appendix C
OMC Soil
Soil Oxydent Demand

	Station:	SO-062	SO-062	SO-062	SO-067	SO-067	SO-067	SO-069	SO-069
	Sample:	05CK14-19	05CK14-20	05CK14-21	05CK14-40	05CK14-41	05CK14-42	05CK14-52	05CK14-56
	Interval:	0.8 - 2.3	4 - 5.5	22 - 24.6	4.5 - 5.5	6 - 6.5	6 - 6.5	0 - 1.7	8 - 10.4
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil
	Date:	3/15/2005	3/15/2005	3/15/2005	3/17/2005	3/17/2005	3/17/2005	3/21/2005	3/21/2005
Soil Oxydent Demand									
SOIL OXYDENT DEMAND	g/kg	0.195	0.131	0.0848	0.19	1.4	1.3	0.047	0.13

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-5
Appendix C
OMC Soil
Soil Oxydent Demand

	Station:	SO-069	SO-069	SO-070	SO-070	SO-070	SO-071	SO-071	SO-071
	Sample:	05CK14-57	05CK14-58	05CK14-64	05CK14-65	05CK14-66	05CK14-67	05CK14-68	05CK14-69
	Interval:	8 - 10.4	24 - 25.5	28 - 28.9	3.3 - 4.5	9.5 - 10.5	4 - 5	9.3 - 10.3	25 - 26.1
	Matrix:	Soil, dup	Soil, dup	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/21/2005	3/21/2005	3/22/2005	3/22/2005	3/22/2005	3/22/2005	3/22/2005	3/22/2005
Soil Oxydent Demand									
SOIL OXYDENT DEMAND	g/kg	0.07	0.6	0.023	0.064	0.013	0.091	0.061	0.031

Table 2-5
Appendix C
OMC Soil
Soil Oxydent Demand

	Station:	SO-071	SO-079	SO-079	SO-081	SO-081	SO-081	SO-081	SO-081
	Sample:	05CK14-70	05CK28-02	05CK28-06	05CK28-15	05CK28-16	05CK28-17	05CK28-26	05CK28-27
	Interval:	25 - 26.1	1.4 - 2.7	24 - 24.9	4 - 4.9	8 - 8.7	8 - 8.7	25 - 26.9	25 - 26.9
	Matrix:	Soil, dup	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil, dup
	Date:	3/22/2005	3/29/2005	3/29/2005	3/30/2005	3/30/2005	3/30/2005	3/31/2005	3/31/2005
Soil Oxydent Demand									
SOIL OXYDENT DEMAND	g/kg	0.032	0.0065	0.011	0.0092	0.16	0.14	0.062	0.035

Table 2-5
Appendix C
OMC Soil
Soil Oxydent Demand

	Station:	SO-082	SO-082	SO-082
	Sample:	05CK28-19	05CK28-20	05CK28-25
	Interval:	4 - 5	8 - 8.7	17.3 - 18.7
	Matrix:	Soil	Soil	Soil
	Date:	3/30/2005	3/30/2005	3/31/2005
Soil Oxydent Demand				
SOIL OXYDENT DEMAND	g/kg	0.006	0.01	0.0054

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-061	SO-061	SO-061	SO-062	SO-063	SO-063	SO-063	SO-065
	Sample:	05CK14-13	05CK14-17	05CK14-46	05CK14-18	05CK14-22	05CK14-23	05CK14-24	05CK14-31
	Interval:	4 - 6	24.5 - 26.5	1.3 - 2.3	20.5 - 22	20.5 - 22	6.5 - 7.5	1.5 - 2.5	0.9 - 1.9
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/14/2005	3/15/2005	3/14/2005	3/15/2005	3/15/2005	3/15/2005	3/15/2005	3/16/2005
Geotechnical and Wet Chemistry									
BULK DENSITY OF SOILS	g/cc	1.61	1.84	1.3	1.35	1.34	1.32	1.44	1.3
SIEVE NO. 10, PERCENT PASSING	percent	82.92	78.61	94.39	95.28	100	98.13	84.02	98.98
SIEVE NO. 200, PERCENT PASSING	percent	2.73	7.52	2.17	14.02	4.42	1	1.88	3.44
SIEVE NO. 4, PERCENT PASSING	percent	94.85	97.45	97.07	96.88	100	99.62	90.01	99.97
SIEVE NO. 40, PERCENT PASSING	percent	61.56	31.1	77.97	94.25	99.75	91.84	68.78	90.72
SIEVE NO. 80, PERCENT PASSING	percent	5.64	18.14	5.17	89.69	93.15	5.18	19.67	36.56
SIEVE, NO. 100, PERCENT PASSING	percent	4.6	15.9	3.9	82.95	60.35	2.72	14.86	27.89
SIEVE, NO. 20, PERCENT PASSING	percent	75.57	47.45	91.83	94.81	99.88	96.8	76.98	94.59
SIEVE, NO. 60, PERCENT PASSING	percent	17.57	22.71	20.88	92.67	99.48	31.91	38.34	67.49
VOID RATIO OF SOILS	percent	52.6	20.6	55.8	41	33.6	42.9	44.3	46.5

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-065	SO-065	SO-066	SO-066	SO-066	SO-067	SO-067	SO-067
	Sample:	05CK14-32	05CK14-33	05CK14-36	05CK14-37	05CK14-39	05CK14-43	05CK14-44	05CK14-45
	Interval:	6.4 - 7.4	20 - 21	1 - 2	5 - 6.5	29 - 30	5 - 6	6.5 - 7.5	28 - 28.8
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/16/2005	3/17/2005	3/17/2005	3/17/2005
Geotechnical and Wet Chemistry									
BULK DENSITY OF SOILS	g/cc	1.68	1.32	1.62	1.38	1.19	1.51	1.5	1.27
SIEVE NO. 10, PERCENT PASSING	percent	35.4	99.93	84.25	99.77	85.94	88.72	61.2	85.6
SIEVE NO. 200, PERCENT PASSING	percent	1.22	4.22	2.33	1.13	18.2	3.96	1.24	12.31
SIEVE NO. 4, PERCENT PASSING	percent	59.28	100	95.68	100	99.62	98.25	87.85	97.81
SIEVE NO. 40, PERCENT PASSING	percent	10.42	99.53	59.16	98.52	44.01	60.85	31.76	67.83
SIEVE NO. 80, PERCENT PASSING	percent	2.5	84.71	9.79	9.54	31.22	10.43	3.35	63.42
SIEVE, NO. 100, PERCENT PASSING	percent	2	44.28	6.34	4.45	29.37	8.54	2.19	61.58
SIEVE, NO. 20, PERCENT PASSING	percent	19.23	99.71	71.6	99.53	59.95	77.27	40.06	73.71
SIEVE, NO. 60, PERCENT PASSING	percent	5.06	98.8	31.02	55.45	35.25	21.72	15.37	65.09
VOID RATIO OF SOILS	percent	69.7	35.1	68.8	41.8	12.1	73	58.3	50.2

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-068	SO-068	SO-069	SO-069	SO-069	SO-070	SO-070	SO-070
	Sample:	05CK14-47	05CK14-51	05CK14-53	05CK14-54	05CK14-55	05CK14-59	05CK14-60	05CK14-61
	Interval:	1 - 2.5	5.5 - 6.5	26.5 - 27.5	4 - 5.5	5.5 - 6.5	28.9 - 29.9	4.5 - 5.6	8 - 9.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/21/2005	3/21/2005	3/21/2005	3/21/2005	3/21/2005	3/22/2005	3/22/2005	3/22/2005
Geotechnical and Wet Chemistry									
BULK DENSITY OF SOILS	g/cc	1.4	1.29	1.79	1.39	1.49	1.32	1.46	1.63
SIEVE NO. 10, PERCENT PASSING	percent								
SIEVE NO. 200, PERCENT PASSING	percent								
SIEVE NO. 4, PERCENT PASSING	percent	96.38	99.19		86.39	98.97		96.37	94.46
SIEVE NO. 40, PERCENT PASSING	percent								
SIEVE NO. 80, PERCENT PASSING	percent								
SIEVE, NO. 100, PERCENT PASSING	percent			9.87					
SIEVE, NO. 20, PERCENT PASSING	percent						99.6		
SIEVE, NO. 60, PERCENT PASSING	percent								
VOID RATIO OF SOILS	percent	75.1	55.8	49	90.6	47.9	32.3	63.4	60.5

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-071	SO-071	SO-071	SO-072	SO-072	SO-072	SO-074
	Sample:	05CK14-62	05CK14-63	05CK14-71	05CK14-75	05CK14-76	05CK14-77	05CK14-81
	Interval:	2.4 - 3.4	8.3 - 9.3	24 - 25	1 - 2	5 - 6	24.4 - 25.4	0.5 - 1.5
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/22/2005	3/22/2005	3/22/2005	3/23/2005	3/23/2005	3/23/2005	3/24/2005
Geotechnical and Wet Chemistry								
BULK DENSITY OF SOILS	g/cc	1.3	1.45	1.46	1.4	1.44	1.31	1.33
SIEVE NO. 10, PERCENT PASSING	percent							
SIEVE NO. 200, PERCENT PASSING	percent							
SIEVE NO. 4, PERCENT PASSING	percent	99.29	97.66	99.31	95.09	98.9		64.03
SIEVE NO. 40, PERCENT PASSING	percent							
SIEVE NO. 80, PERCENT PASSING	percent							
SIEVE, NO. 100, PERCENT PASSING	percent							
SIEVE, NO. 20, PERCENT PASSING	percent						99.9	
SIEVE, NO. 60, PERCENT PASSING	percent							
VOID RATIO OF SOILS	percent	96.2	30.8	22.7	46.6	34.2	39.8	81.5

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-074	SO-074	SO-075	SO-075	SO-075	SO-077	SO-077
	Sample:	05CK14-82	05CK14-83	05CK14-84	05CK14-85	05CK14-89	05CK14-90	05CK14-93
	Interval:	2.5 - 3.5	24.1 - 25.1	2.4 - 3.3	5.9 - 6.9	24 - 24.8	1.6 - 2.6	24.3 - 25.3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/24/2005	3/24/2005	3/24/2005	3/24/2005	3/24/2005	3/28/2005	3/28/2005
Geotechnical and Wet Chemistry								
BULK DENSITY OF SOILS	g/cc	1.44	1.36	1.2	1.39	1.54	1.59	1.45
SIEVE NO. 10, PERCENT PASSING	percent							99.84
SIEVE NO. 200, PERCENT PASSING	percent							8.96
SIEVE NO. 4, PERCENT PASSING	percent	99.04		83.06	96.36	98.11	95.85	100
SIEVE NO. 40, PERCENT PASSING	percent							97.2
SIEVE NO. 80, PERCENT PASSING	percent							91.61
SIEVE, NO. 100, PERCENT PASSING	percent							85.75
SIEVE, NO. 20, PERCENT PASSING	percent		99.94					98.46
SIEVE, NO. 60, PERCENT PASSING	percent							95.08
VOID RATIO OF SOILS	percent	56.6	44.1	78.2	41.7	48.9	88.7	37.3

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-077	SO-078	SO-078	SO-079	SO-079	SO-079	SO-080	SO-080
	Sample:	05CK14-95	05CK14-97	05CK14-98	05CK28-03	05CK28-05	05CK28-07	05CK28-08	05CK28-11
	Interval:	8.5 - 10	1.5 - 2.5	16.1 - 17.1	1.6 - 2.6	4.5 - 6	20.6 - 21.6	1 - 2.5	29 - 30.4
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/28/2005	3/29/2005	3/29/2005	3/29/2005	3/29/2005	3/29/2005	3/30/2005	3/30/2005
Geotechnical and Wet Chemistry									
BULK DENSITY OF SOILS	g/cc	1.36	1.48	1.39	1.36	1.89	1.61	1.45	1.23
SIEVE NO. 10, PERCENT PASSING	percent	95.37	91.16	99.05	99.02	95.21	87.99	94.49	100
SIEVE NO. 200, PERCENT PASSING	percent	0.96	3.73	3.84	0.66	0.9	1.6	1.85	5.73
SIEVE NO. 4, PERCENT PASSING	percent	96.53	97.03	99.83	99.54	97.15	95.6	96.11	100
SIEVE NO. 40, PERCENT PASSING	percent	89.97	12.34	98.44	91.56	84.86	63.51	87.21	99.97
SIEVE NO. 80, PERCENT PASSING	percent	5.6	3.73	91.12	5.12	4.62	12.33	17.01	99.35
SIEVE, NO. 100, PERCENT PASSING	percent	2.68	3.73	74.39	2.81	2.99	6.47	8.75	97.3
SIEVE, NO. 20, PERCENT PASSING	percent	94.27	77.7	98.66	98.11	93.21	70.58	91.94	100
SIEVE, NO. 60, PERCENT PASSING	percent	37.01	3.85	97.88	29.83	25.32	44.88	60.01	99.83
VOID RATIO OF SOILS	percent	45.5	41.2	43.7	63.3	47.4	60.9	85.6	47.3

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-6
Appendix C
OMC Soil
Geotechnical

	Station:	SO-080	SO-081	SO-081	SO-081	SO-082	SO-082	SO-082
	Sample:	05CK28-13	05CK28-14	05CK28-18	05CK28-23	05CK28-21	05CK28-22	05CK28-24
	Interval:	8 - 9.7	0.3 - 1.4	9.9 - 10.9	24 - 25	5 - 6	8.7 - 9.7	16 - 17.3
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/30/2005	3/30/2005	3/30/2005	3/31/2005	3/30/2005	3/30/2005	3/31/2005
Geotechnical and Wet Chemistry								
BULK DENSITY OF SOILS	g/cc	1.34	1.26	1.44	1.38	1.41	1.52	1.31
SIEVE NO. 10, PERCENT PASSING	percent	100	67.52	95.17	76.32	60.65	99.91	99.75
SIEVE NO. 200, PERCENT PASSING	percent	1.66	1.67	1.06	0.97	3.85	1.31	2.03
SIEVE NO. 4, PERCENT PASSING	percent	100	80.38	95.66	86.02	78.16	100	100
SIEVE NO. 40, PERCENT PASSING	percent	97.51	42.28	90.78	63.08	34.52	96.22	98.53
SIEVE NO. 80, PERCENT PASSING	percent	6.13	4.48	5.16	22.72	7.38	9.29	16.52
SIEVE, NO. 100, PERCENT PASSING	percent	3.87	3.48	2.9	7.79	6.34	4.33	7.99
SIEVE, NO. 20, PERCENT PASSING	percent	99.98	56.46	94.22	67.83	45.96	99.81	99.41
SIEVE, NO. 60, PERCENT PASSING	percent	34.54	14.47	38.52	45.52	14.71	51.26	74.19
VOID RATIO OF SOILS	percent	48.9	73.6	45.2	40.4	59.8	49.5	48

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-7
Appendix C
OMC Soil
Total Organic Carbon

	Station:	SO-061	SO-062	SO-062	SO-066	SO-067	SO-067	SO-070	SO-071
	Sample:	05CK14-16	05CK14-19	05CK14-20	05CK14-34	05CK14-41	05CK14-42	05CK14-65	05CK14-69
	Interval:	24 - 24.5	0.8 - 2.3	4 - 5.5	0.5 - 1	6 - 6.5	6 - 6.5	3.3 - 4.5	25 - 26.1
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil, dup	Soil	Soil
	Date:	3/15/2005	3/15/2005	3/15/2005	3/16/2005	3/17/2005	3/17/2005	3/22/2005	3/22/2005
Wet Chemistry									
TOTAL ORGANIC CARBON	µg/kg	2,000,000	3,400,000	2,100,000	170,000 J	1,200,000	900,000	730,000	1,400,000

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-7
Appendix C
OMC Soil
Total Organic Carbon

	Station:	SO-074	SO-074	SO-077	SO-077	SO-078	SO-078	SO-079	SO-081
	Sample:	05CK14-78	05CK14-79	05CK14-91	05CK14-92	05CK14-96	05CK28-01	05CK28-06	05CK28-15
	Interval:	0.4 - 0.8	2.1 - 2.4	2.6 - 2.8	24 - 24.3	0 - 0.6	20 - 20.7	24 - 24.9	4 - 4.9
	Matrix:	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
	Date:	3/24/2005	3/24/2005	3/28/2005	3/28/2005	3/29/2005	3/29/2005	3/29/2005	3/30/2005
Wet Chemistry									
TOTAL ORGANIC CARBON	µg/kg	9,600,000	19,000,000	120,000 J	2,500,000	8,800,000	1,900,000	1,400,000	2,900,000

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 2-7
Appendix C
OMC Soil
Total Organic Carbon

	Station:	SO-081	SO-081	SO-081	SO-081
	Sample:	05CK28-16	05CK28-17	05CK28-26	05CK28-27
	Interval:	8 - 8.7	8 - 8.7	25 - 26.9	25 - 26.9
	Matrix:	Soil	Soil, dup	Soil	Soil, dup
	Date:	3/30/2005	3/30/2005	3/31/2005	3/31/2005
Wet Chemistry					
TOTAL ORGANIC CARBON	µg/kg	5,600,000	7,400,000	2,800,000	2,000,000

Qualifier Key: " " - detected; "J" - detected, estimated; "Ja" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-1
Appendix C
OMC Water Grab Samples
Metals

	Station:	GW-046	GW-046	GW-046
	Sample:	ME2GT1	ME2GT2	ME2GT3
	Matrix:	Water	Water	Water
	Date:	2/10/2005	2/10/2005	2/10/2005
Metals				
BARIUM	µg/L	143 J	159 J	108 J
CALCIUM METAL	µg/L	135,000	163,000	160,000
IRON	µg/L	5,570	8,650	100 U
MAGNESIUM	µg/L	59,200	81,200	36,500
MANGANESE	µg/L	514	383	320
MERCURY	µg/L	0.2 U	0.2 U	0.066 J
POTASSIUM	µg/L	18,500 J	17,600 J	12,500 J
SODIUM	µg/L	306,000 J	245,000 J	127,000 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-2
Appendix C
OMC Water Grab Samples
Metals

Matrix:	Station: Sample: Date:	GW-046 E2GT1 Water 2/10/2005	GW-046 E2GT2 Water 2/10/2005	GW-046 E2GT3 Water 2/10/2005	GW-047 E2GT6 Water 2/10/2005	GW-047 E2GT7 Water 2/10/2005	GW-047 E2GT9 Water 2/10/2005	GW-048 E2GW0 Water 2/11/200
Volatile Organic Compounds								
1,1,1-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
1,1,2-TRICHLORO-1,2,	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
1,1,2-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.34
1,1-DICHLOROETHANE	µg/L	0.55	0.51	0.5 U	250 U	250 U	1.6 U	26
1,1-DICHLOROETHYLENE	µg/L	0.5 U	0.5 U	0.5 U	250 U	110 J	1.6 U	120
1,2,4-TRICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
1,4-DICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
2-BUTANONE	µg/L	5 U	5 U	5 U	2,500 U	2,500 U	16 U	5
2-HEXANONE	µg/L	5 U	5 U	5 U	2,500 U	2,500 U	16 U	5
ACETONE	µg/L	2.7 J	2.4 J	2.5 J	2,500 U	2,500 U	15 J	7.8
BENZENE	µg/L	0.2 J	0.18 J	0.26 J	250 U	250 U	1.6 U	3.1
CARBON DISULFIDE	µg/L	0.5 U	0.16 J	0.29 J	250 U	250 U	0.61 J	0.5
CHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.48
CHLOROFORM	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	1.6
CHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
CIS-1,2-DICHLOROETHYLENE	µg/L	0.5 U	0.5 U	0.5 U	9,200	20,000	27	2100
CYCLOHEXANE	µg/L	0.24 J	0.16 J	0.26 J	250 U	250 U	1.6 U	0.36
ETHYLBENZENE	µg/L	0.12 J	0.5 U	0.13 J	250 U	250 U	1.6 U	0.18
METHYLCYCLOHEXANE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.5
METHYLENE CHLORIDE	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	3.9 UJ	0.75
TETRACHLOROETHYLENE(PCE)	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.43
TOLUENE	µg/L	0.38 J	0.28 J	0.44 J	250 U	250 U	0.49 J	1.1
TRANS-1,2-DICHLOROETHENE	µg/L	0.5 U	0.5 U	0.5 U	69 J	130 J	1.6 U	230
TRICHLOROETHYLENE	µg/L	0.5 U	0.3 J	0.45 J	720	2,300	17	1,500
VINYL CHLORIDE	µg/L	0.5 UJ	0.5 UJ	0.5 UJ	2,800	3,000	4.5	1,400
XYLENES, TOTAL	µg/L	0.5 U	0.5 U	0.5 U	250 U	250 U	1.6 U	0.25

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-2
Appendix C
OMC Water Grab Samples
Metals

		3	GW-048	GW-048	GW-049	GW-049	GW-049	GW-049
	Station:	)	E2GW1	E2GW2	E2GW3	E2GW4	E2GW7	E2GW8
	Sample:		Water	Water	Water	Water	Water	Water, dup
Matrix:	Date:	5	2/11/2005	2/11/2005	2/11/2005	2/11/2005	2/11/2005	2/11/2005
Volatile Organic Compounds								
1,1,1-TRICHLOROETHANE	µg/L	U	500 U	500 U	8.3 U	31 U	0.5 U	0.5 U
1,1,2-TRICHLORO-1,2,	µg/L	U	500 U	160 J	8.3 U	31 UJ	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	µg/L	J	500 U	500 U	8.3 U	31 U	0.5 U	0.5 U
1,1-DICHLOROETHANE	µg/L		500 U	500 U	8.3 U	31 U	0.43 J	0.44 J
1,1-DICHLOROETHYLENE	µg/L	J	130 J	150 J	8.3 U	14 J	210 J	220 J
1,2,4-TRICHLOROBENZENE	µg/L	U	500 U	160 J	8.3 U	31 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	µg/L	U	500 U	110 J	8.3 U	31 U	0.5 U	0.5 U
2-BUTANONE	µg/L	U	5,000 U	5,000 U	83 U	310 U	5 U	5 U
2-HEXANONE	µg/L	U	5,000 U	5,000 U	83 U	310 U	5 U	5 U
ACETONE	µg/L		5,000 U	5,000 U	83 U	310 UJ	4.1 J	3.2 J
BENZENE	µg/L		500 U	500 U	8.3 U	31 U	0.18 J	0.19 J
CARBON DISULFIDE	µg/L	U	500 U	500 U	8.3 U	31 U	1.7	0.44 J
CHLOROETHANE	µg/L	J	500 U	500 U	110	31 U	0.5 U	0.5 U
CHLOROFORM	µg/L		500 U	500 U	8.3 U	31 U	0.5 U	0.5 U
CHLOROMETHANE	µg/L	U	500 U	500 U	8.3 U	31 U	0.17 J	0.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L	J	14,000	11,000	8.3 U	690	1,500 J	1,700 J
CYCLOHEXANE	µg/L	J	500 U	500 U	8.3 U	31 U	0.13 J	0.12 J
ETHYLBENZENE	µg/L	J	500 U	500 U	8.3 U	31 U	0.5 U	0.5 U
METHYLCYCLOHEXANE	µg/L	U	500 U	500 U	8.3 U	31 U	0.5 U	0.5 U
METHYLENE CHLORIDE	µg/L	UJ	500 U	170 J	2.3 J	31 UJ	0.7 UJ	0.82 UJ
TETRACHLOROETHYLENE(PCE)	µg/L	J	500 U	110 J	8.3 U	31 U	0.5 U	0.5 U
TOLUENE	µg/L		500 U	500 U	8.3 U	31 U	2	2.1
TRANS-1,2-DICHLOROETHENE	µg/L	J	170 J	150 J	8.3 U	31 U	320 J	250 J
TRICHLOROETHYLENE	µg/L		16,000	1,600	8.3 U	31 U	1,200 J	1,300 J
VINYL CHLORIDE	µg/L	J	4,300	3,700	8.3 U	290	490 J	500 J
XYLENES, TOTAL	µg/L	J	500 U	500 U	8.3 U	31 U	0.5 U	0.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-2
Appendix C
OMC Water Grab Samples
Metals

Matrix:	Station: / Sample: / Date:	GW-055	GW-055	GW-055	GW-056	GW-056	GW-056	SO-057
	Station:	E2GZ5	E2GZ6	E2GZ7	E2HA2	E2HA3	E2HA6	E2HA7
	Sample:	Water	Water	Water	Water	Water	Water	Water
Matrix:	Date:	2/22/2005	2/22/2005	2/22/2005	2/23/2005	2/23/2005	2/23/2005	2/24/200
Volatile Organic Compounds								
1,1,1-TRICHLOROETHANE	µg/L	2.5 U	2.5 U	0.5 U	2.3	0.5 U	0.5 U	0.5
1,1,2-TRICHLORO-1,2,	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1,2-TRICHLOROETHANE	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1-DICHLOROETHANE	µg/L	2.8	2.5 U	0.98	3.9	0.21 J	0.5 U	2.8
1,1-DICHLOROETHYLENE	µg/L	2.5 U	6.7 J	8.8	0.5 U	0.85	0.5 U	13
1,2,4-TRICHLOROBENZENE	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,4-DICHLOROBENZENE	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
2-BUTANONE	µg/L	25 U	25 U	5 U	5 U	5 U	1.6 J	5
2-HEXANONE	µg/L	25 U	25 U	5 U	5 U	5 U	0.49 J	5
ACETONE	µg/L	6.3 J	25 U	2.4 J	5 U	2.1 J	3.6 J	2.3
BENZENE	µg/L	0.85 J	2.5 UJ	0.44 J	0.17 J	0.5 U	0.5 U	0.44
CARBON DISULFIDE	µg/L	2.5 U	2.5 U	0.11 J	0.5 U	0.5 U	0.17 J	0.5
CHLOROETHANE	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.38
CHLOROFORM	µg/L	2.5 U	2.5 U	0.28 J	0.98	0.5 U	0.5 U	0.83
CHLOROMETHANE	µg/L	2.5 U	4.1	0.5 U	0.5 U	0.5 U	0.5 U	0.5
CIS-1,2-DICHLOROETHYLENE	µg/L	5,200	6,200	720	350	350	0.48 J	3,500
CYCLOHEXANE	µg/L	2.5 U	2.5 U	0.2 J	0.5 U	0.5 U	0.5 U	0.5
ETHYLBENZENE	µg/L	2.5 U	2.5 U	0.11 J	0.5 U	0.5 U	0.5 U	0.5
METHYLCYCLOHEXANE	µg/L	2.5 U	2.5 U	0.21 J	0.5 U	0.5 U	0.5 U	0.5
METHYLENE CHLORIDE	µg/L	0.75 J	2.5 U	0.17 J	0.5 U	0.5 U	0.5 U	0.5
TETRACHLOROETHYLENE(PCE)	µg/L	2.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
TOLUENE	µg/L	2.5 U	2.5 UJ	0.39 J	0.15 J	0.16 J	0.5 U	0.21
TRANS-1,2-DICHLOROETHENE	µg/L	33	18	6.5	7.7	2	0.5 U	110
TRICHLOROETHYLENE	µg/L	1,300	2 J	1,900	630	8.7	1.8	210
VINYL CHLORIDE	µg/L	2,300	1,700	16	520	900	0.32 J	3.7
XYLENES, TOTAL	µg/L	2.5 U	2.5 U	0.27 J	0.5 U	0.5 U	0.5 U	0.5

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-2
Appendix C
OMC Water Grab Samples
Metals

		'	SO-057	SO-058	SO-058	SO-058	SO-059	SO-059
	Station:		E2HA8	E2HB1	E2HB2	E2HB3	E2HB5	E2HB6
	Sample:		Water	Water	Water	Water	Water	Water
Matrix:	Date:	5	2/24/2005	2/28/2005	2/28/2005	2/28/2005	2/28/2005	2/28/2005
Volatile Organic Compounds								
1,1,1-TRICHLOROETHANE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
1,1,2-TRICHLORO-1,2,	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
1,1,2-TRICHLOROETHANE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
1,1-DICHLOROETHANE	µg/L		0.58	13	0.5 U	4.8	5.1	2.1 J
1,1-DICHLOROETHYLENE	µg/L		0.5 U	49	0.5 U	10	27	6.7
1,2,4-TRICHLOROBENZENE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
1,4-DICHLOROBENZENE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
2-BUTANONE	µg/L	U	5 U	50 U	5 U	5 U	25 U	25 U
2-HEXANONE	µg/L	U	5 U	50 U	5 U	5 U	25 U	25 U
ACETONE	µg/L	J	1.8 J	50 U	5 U	5 U	25 U	25 U
BENZENE	µg/L	J	0.29 J	5 U	0.5 U	0.49 J	3.1	2.5 U
CARBON DISULFIDE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
CHLOROETHANE	µg/L	J	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
CHLOROFORM	µg/L		0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
CHLOROMETHANE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L		310	23,000	2.2	1,900	12,000	6,700
CYCLOHEXANE	µg/L	U	0.5 U	5 U	0.5 U	0.22 J	2.5 U	2.5 U
ETHYLBENZENE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
METHYLCYCLOHEXANE	µg/L	U	0.5 U	5 U	0.5 U	0.28 J	2.5 U	2.5 U
METHYLENE CHLORIDE	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
TETRACHLOROETHYLENE(PCE)	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U
TOLUENE	µg/L	J	0.38 J	5 U	0.5 U	0.49 J	2.5 U	2.5 U
TRANS-1,2-DICHLOROETHENE	µg/L		2.1	120	0.5 U	12	26	31
TRICHLOROETHYLENE	µg/L		0.75	5 U	0.5 U	38 J	0.95 J	2.5 U
VINYL CHLORIDE	µg/L		220	12,000	25	860	6,500	3,400
XYLENES, TOTAL	µg/L	U	0.5 U	5 U	0.5 U	0.5 U	2.5 U	2.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-2
Appendix C
OMC Water Grab Samples
Metals

Matrix:	Station: / Sample: / Date:	SO-059 E2HB7 Water 2/28/2005	SO-059 E2HB8 Water, dup 2/28/2005	SO-060 E2HC1 Water 3/1/2005	SO-060 E2HC3 Water 3/1/2005
Volatile Organic Compounds					
1,1,1-TRICHLOROETHANE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
1,1,2-TRICHLORO-1,2,	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	µg/L	5 UJ	5 UJ	0.5 U	0.5 UJ
1,1-DICHLOROETHANE	µg/L	140 J	130 J	0.5 U	0.5 U
1,1-DICHLOROETHYLENE	µg/L	64 J	52 J	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
1,4-DICHLOROBENZENE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
2-BUTANONE	µg/L	50 R	50 R	5 U	5 U
2-HEXANONE	µg/L	50 R	50 R	5 U	5 U
ACETONE	µg/L	50 R	50 R	5 U	5 U
BENZENE	µg/L	5 R	5 R	0.21 J	0.17 J
CARBON DISULFIDE	µg/L	5 R	5 R	0.5 U	0.19 J
CHLOROETHANE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
CHLOROFORM	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
CHLOROMETHANE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L	19,000 J	16,000 J	0.22 J	0.56
CYCLOHEXANE	µg/L	5 R	5 R	0.5 U	0.5 U
ETHYLBENZENE	µg/L	5 R	5 R	0.5 U	0.5 U
METHYLCYCLOHEXANE	µg/L	5 R	5 R	0.5 U	0.17 J
METHYLENE CHLORIDE	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
TETRACHLOROETHYLENE(PCE)	µg/L	5 UJ	5 UJ	0.5 U	0.5 U
TOLUENE	µg/L	5 R	5 R	0.28 J	0.28 J
TRANS-1,2-DICHLOROETHENE	µg/L	67 J	59 J	0.5 U	0.5 U
TRICHLOROETHYLENE	µg/L	3.2 J	2.6 J	1.1	0.5 U
VINYL CHLORIDE	µg/L	4,200 J	4,400 J	0.5 U	0.39 J
XYLENES, TOTAL	µg/L	5 R	5 R	0.5 U	0.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-003D	MW-003D	MW-003S	MW-003S	MW-011D	MW-011D	MW-011S
	Sample:	ME2HM7	ME2HM8	ME2HN2	ME2HN3	ME2HQ5	ME2HQ6	ME2HR4
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	4/28/2005	4/28/2005	4/28/2005	4/28/2005	5/2/2005	5/2/2005	5/2/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	221 J	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	1,430	1,380 J	201	198	10 UJ	10 UJ	10 U
BARIUM	µg/L	297	246 J	200 U	200 U	200 UJ	200 UJ	200 UJ
CALCIUM METAL	µg/L	12,800	12,900 J	87,100	86,400	168,000	168,000	90,600
CHROMIUM, TOTAL	µg/L	6.6 J	4.8 J	10 U	10 U	10 U	10 U	5.2 J
COBALT	µg/L	0.85 J	50 UJ	0.7 J	50 U	50 UJ	50 UJ	50 U
COPPER	µg/L	25 U	25 UJ	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L	146 J		99.2		13		1.7 J
IRON	µg/L	2,750	630 J	363	265	8,070	197	3,970
LEAD	µg/L	10 U	10 UJ	10 U	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	23,300	25,300 J	19,100	18,700	40,700	41,000	28,400
MANGANESE	µg/L	42.9	33 J	53.8	53.3	46.7 J	44.5 J	332
MERCURY	µg/L	0.2	0.2	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 UJ	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	8,790 J	9,010 J	1,970 J	1,960 J	10,700 J	10,700 J	2,730 J
SELENIUM	µg/L	35 U	35 UJ	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	498,000 J	524,000 J	48,600 J	49,100 J	135,000	134,000	51,500
VANADIUM (FUME OR DUST)	µg/L	25.4 J	25.7 J	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	60 U	60 UJ	60 U	60 U	5.9 J	60 U	2.9 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-011S	MW-014D	MW-014D	MW-014D	MW-014D	MW-014S	MW-014S
	Sample:	ME2HR5	ME2HM1	ME2HM2	ME2HM3	ME2HM4	ME2HM5	ME2HM6
	Matrix:	Water	Water	Water	Water, dup	Water, dup	Water	Water
	Date:	5/2/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	368 J	200 UJ	831 J	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	10 U	1,250	988	1,240	932	214	126
BARIUM	µg/L	200 UJ	523	467	516	470	200 U	200 U
CALCIUM METAL	µg/L	91,400	177,000	168,000	169,000	164,000	89,000	90,700
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	1.1 J	10 U	10 U	10 U
COBALT	µg/L	0.92 J	50 U	50 U	50 U	50 U	50 U	50 U
COPPER	µg/L	25 U	25 UJ	25 UJ	25 UJ	25 UJ	25 U	25 U
CYANIDE	µg/L		26.2		24		5.4 J	
IRON	µg/L	987	2,590	21 J	2,980	31.3 J	4,790	481
LEAD	µg/L	10 U	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U
MAGNESIUM	µg/L	28,700	64,400	61,000	61,300	59,300	19,400	19,800
MANGANESE	µg/L	332	55.9 J	48.4 J	62.6 J	46.4 J	260	256
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	2,790 J	5,970 J	6,270 J	7,070 J	6,700 J	3,250 J	3,290 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	51,600	637,000 J	595,000 J	144,000 J	624,000 J	91,000 J	91,500 J
VANADIUM (FUME OR DUST)	µg/L	50 U	2.1 J	1.1 J	2.7 J	0.86 J	50 U	50 U
ZINC	µg/L	60 U	60 U	60 U	60 U	60 U	60 U	60 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-015D	MW-015D	MW-015S	MW-015S	MW-015S	MW-015S	MW-100
	Sample:	ME2HN0	ME2HN1	ME2HN8	ME2HN9	ME2HP0	ME2HP1	ME2HL3
	Matrix:	Water	Water	Water	Water	Water, dup	Water, dup	Water
	Date:	4/28/2005	4/28/2005	4/29/2005	4/29/2005	4/29/2005	4/29/2005	4/27/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	12.9 J	10 UJ	10 U	10 U	10 U	10 U	59.2
BARIUM	µg/L	200 U	200 U	200 U	200 U	200 U	200 U	200 U
CALCIUM METAL	µg/L	156,000	151,000	101,000	100,000	104,000	104,000	69,200
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
COPPER	µg/L	25 UJ	25 UJ	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L	20		10 U		10 U		10 UJ
IRON	µg/L	4,220	1,440	95.2 J	9.1 J	56.5 J	100 U	2,020
LEAD	µg/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	72,300	70,700	25,200	25,100	25,300	25,200	11,900
MANGANESE	µg/L	81.1 J	72.8 J	619	555	603	562	138
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	7,580 J	7,270 J	2,410 J	2,420 J	2,420 J	2,370 J	973 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	59,400 J	58,200 J	5,060 J	5,150 J	6,440 J	5,220 J	13,300
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	60 U	60 U	60 U	60 U	60 U	60 U	60 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-100	MW-101	MW-101	MW-102	MW-102	MW-500D	MW-500D
	Sample:	ME2HL4	ME2HL5	ME2HL6	ME2HL9	ME2HM0	ME2HH4	ME2HH5
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	4/27/2005	4/27/2005	4/27/2005	4/28/2005	4/28/2005	4/25/2005	4/25/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	208 J	200 U
ARSENIC	µg/L	42.4	357	269	223	141	10 U	10 U
BARIUM	µg/L	200 U	200 U	200 U	200 U	200 U	330	330
CALCIUM METAL	µg/L	68,900	87,100	84,800	86,200	86,800	129,000	129,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 U	50 U	50 U	50 U	50 UJ	50 UJ
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L		10 U		21.2		5.6 J	
IRON	µg/L	222	1,880	280	3,120	12.7 J	5,600	4,040
LEAD	µg/L	10 U	10 U	10 U	10 U	10 U	10 UJ	10 UJ
MAGNESIUM	µg/L	11,800	18,800	18,400	20,000	20,100	46,500	47,000
MANGANESE	µg/L	131	290	238	221	215	121	109
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	1,000 J	1,200 J	1,230 J	3,160 J	3,080 J	6,720	7,000
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 UJ	35 UJ
SODIUM	µg/L	12,900	24,200	24,400	62,800	60,900	270,000	261,000
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	60 U	60 U	60 U	60 U	60 U	15.9 J	3.5 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-500D	MW-500D	MW-500S	MW-500S	MW-501D	MW-501D	MW-501S
	Sample:	ME2HH6	ME2HH7	ME2HJ5	ME2HJ6	ME2HJ7	ME2HJ8	ME2HJ9
	Matrix:	Water, dup	Water, dup	Water	Water	Water	Water	Water
	Date:	4/25/2005	4/25/2005	4/26/2005	4/26/2005	4/26/2005	4/26/2005	4/26/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 U	200 U	200 U	200 U	200 U	200 U	200 U
ARSENIC	µg/L	10 U	10 U	10 U	10 U	96.3	47.5	10 U
BARIUM	µg/L	340	335	200 U	200 U	200 U	200 U	200 U
CALCIUM METAL	µg/L	130,000	132,000	37,000	38,400	95,600	95,800	125,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 UJ	50 UJ	50 U	50 U	50 U	50 U	50 UJ
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L	5.3 J		6.8 J		2.3 J		1.4 J
IRON	µg/L	5,670	3,840	100 U	100 U	4,940	249	878
LEAD	µg/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
MAGNESIUM	µg/L	47,600	48,100	10,800	11,200	14,600	14,300	31,600
MANGANESE	µg/L	117	110	67.1	69.6	71.4	68.3	142
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	2.2 J
POTASSIUM	µg/L	6,920	6,690	1,920 J	2,030 J	3,560 J	3,460 J	5,810
SELENIUM	µg/L	35 UJ	35 UJ	35 U	35 U	35 U	35 U	35 UJ
SODIUM	µg/L	258,000	261,000	61,200	63,100	65,000	63,100	133,000
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	5 J	7.8 J	2.4 J	5.1 J	60 U	3.2 J	11.9 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-501S	MW-502D	MW-502D	MW-502S	MW-502S	MW-503D	MW-503D
	Sample:	ME2HK0	ME2HZ8	ME2HZ9	ME2HZ2	ME2HZ3	ME2HY4	ME2HY5
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	4/26/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 U	200 UJ	200 UJ	200 UJ	200 UJ	67 J	80.9 J
ARSENIC	µg/L	10 U	10 UJ	10 UJ	10 U	10 U	11.2 J	10 UJ
BARIUM	µg/L	200 U	200 UJ	200 UJ	200 U	200 U	200 U	200 U
CALCIUM METAL	µg/L	125,000	220,000	214,000	103,000	104,000	395,000	391,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 UJ	50 UJ	50 UJ	50 U	50 U	1.4 J	1 J
COPPER	µg/L	25 U	2.2 J	25 U	1.8 J	25 U	25 U	25 U
CYANIDE	µg/L		27.6		23.5		4.3 J	
IRON	µg/L	269	17,200	12,300	5,070	3,160	47,900	50,100
LEAD	µg/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 U	10 U
MAGNESIUM	µg/L	31,400	52,400	50,800	18,800	19,000	101,000	103,000
MANGANESE	µg/L	139	241	226	256	257	943	955
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2	0.2 U
NICKEL	µg/L	2.3 J	40 U	3.3 J	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	5,740	8,230 J	7,840 J	20,200 J	20,500 J	12,900 J	12,500 J
SELENIUM	µg/L	35 UJ	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	136,000	192,000	192,000	120,000	117,000	347,000	339,000
VANADIUM (FUME OR DUST)	µg/L	50 U	0.99 J	50 U	1.4 J	1 J	2.1 J	1.6 J
ZINC	µg/L	11.9 J	17.2 J	2.8 J	14.2 J	2.9 J	60 U	174

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-503D	MW-503D	MW-503S	MW-503S	MW-504D	MW-504D	MW-504S
	Sample:	ME2HY8	ME2HY9	ME2HZ0	ME2HZ1	ME2HW0	ME2HW1	ME2HW2
	Matrix:	Water, dup	Water, dup	Water	Water	Water	Water	Water
	Date:	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/4/2005	5/4/2005	5/4/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	12.5 J	10 UJ	18.2 J	18.4 J	5.7 J	10 UJ	10 U
BARIUM	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	247	232	200 UJ
CALCIUM METAL	µg/L	394,000	393,000	146,000	148,000	138,000	137,000	130,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
COPPER	µg/L	2.4 J	2.1 J	2.6 J	1.7 J	25 U	25 U	2.3 J
CYANIDE	µg/L	10 U		10 U		23.8		10 U
IRON	µg/L	50,500	47,000	35,100	32,000	4,000	642	892
LEAD	µg/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
MAGNESIUM	µg/L	104,000	103,000	29,100	30,100	58,900	59,100	47,300
MANGANESE	µg/L	923	927	1,080	1,100	172	170	918
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	3 J	2.7 J	3.2 J	40 U	8.8 J
POTASSIUM	µg/L	14,200 J	14,100 J	10,600 J	10,900 J	6,560	6,430	10,100
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	349,000	398,000	78,100	80,900	188,000	184,000	65,600
VANADIUM (FUME OR DUST)	µg/L	2.3 J	1.9 J	2.3 J	1.4 J	50 U	50 U	50 U
ZINC	µg/L	3.9 J	5.7 J	13.3 J	5.6 J	8 J	4.9 J	59.3 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-504S	MW-505D	MW-505D	MW-505S	MW-505S	MW-506D	MW-506D
	Sample:	ME2HW3	ME2HX2	ME2HX3	ME2HX0	ME2HX1	ME2HW4	ME2HW5
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/4/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	277	21.3 J	27.4 J	21.2 J	200 UJ	30.9 J
ARSENIC	µg/L	10 U	14 J	10 UJ	10 UJ	10 UJ	10 U	10 UJ
BARIUM	µg/L	200 UJ	200 U	200 U	202	200 U	200 UJ	200 U
CALCIUM METAL	µg/L	131,000	146,000	144,000	166,000	165,000	204,000	192,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 UJ	50 U	50 U	50 U	50 U	50 UJ	0.75 J
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L		1.4 J		1.5 J		10 U	
IRON	µg/L	561	9,290	3,550	15,400	10,800	9,510	3,630
LEAD	µg/L	10 UJ	10 U	10 U	10 U	10 U	10 UJ	10 U
MAGNESIUM	µg/L	47,300	42,400	41,900	34,400	34,100	60,300	58,500
MANGANESE	µg/L	913	110	104	392	390	143	138
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	8.7 J	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	9,950	5,470 J	5,510 J	14,800 J	15,000 J	6,740	6,570 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	64,300	112,000	114,000	79,900	80,500	78,200	81,400
VANADIUM (FUME OR DUST)	µg/L	50 U	0.98 J	50 U	1.3 J	0.84 J	50 U	50 U
ZINC	µg/L	7.8 J	60 U	60 U	60 U	60 U	4.7 J	60 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-506D	MW-506D	MW-506S	MW-506S	MW-507D	MW-507D	MW-507S
	Sample:	ME2HW6	ME2HW7	ME2HW8	ME2HW9	ME2HR6	ME2HR7	ME2HR8
	Matrix:	Water, dup	Water, dup	Water	Water	Water	Water	Water
	Date:	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/2/2005	5/2/2005	5/2/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	28.7 J	200 UJ	18.2 J	536	200 UJ	200 UJ
ARSENIC	µg/L	10 U	10 UJ	10 U	10 UJ	10 U	10 U	10 U
BARIUM	µg/L	200 UJ	200 U	200 UJ	200 U	200 UJ	200 UJ	200 UJ
CALCIUM METAL	µg/L	203,000	198,000	143,000	135,000	97,800	96,200	58,700
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 UJ	50 U	50 UJ	4.2 J	50 U	50 U	50 U
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L	10 U		10 U		10 U		10 U
IRON	µg/L	9,690	3,700	9,110	4,580	3,280	1,180	1,800
LEAD	µg/L	10 UJ	10 U	10 UJ	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	61,100	58,200	33,400	31,200	32,900	31,800	17,400
MANGANESE	µg/L	146	141	392	372	146	136	174
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	3.2 J	40 U	2.9 J	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	6,780	6,640 J	11,800	11,600 J	3,880 J	3,650 J	1,850 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	79,400	82,100	75,400	78,400	42,000	41,100	23,600
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	1.1 J	50 U	0.99 J
ZINC	µg/L	5.7 J	60 U	60 U	60 U	8.5 J	5 J	2.5 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-507S	MW-508D	MW-508D	MW-508S	MW-508S	MW-509D	MW-509D
	Sample:	ME2HR9	ME2HL1	ME2HL2	ME2HL7	ME2HL8	ME2HP6	ME2HP7
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/2/2005	4/27/2005	4/27/2005	4/27/2005	4/27/2005	4/29/2005	4/29/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	297 J	200 UJ	200 UJ	200 UJ	402 J	200 UJ
ARSENIC	µg/L	10 U	10 U	10 U	10 U	11.1 J	10 UJ	10 U
BARIUM	µg/L	200 UJ	200 U	200 U	200 U	200 U	200 U	200 UJ
CALCIUM METAL	µg/L	60,200	69,700	71,500	89,400	90,400	170,000	174,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 UJ
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 UJ	25 U
CYANIDE	µg/L		10 UJ		10 U		10 U	
IRON	µg/L	770	1,960	38.7 J	2,590	1,520	7,440	1,990
LEAD	µg/L	10 U	10 U	10 U	10 U	10 U	10 UJ	10 U
MAGNESIUM	µg/L	17,600	17,400	17,400	15,300	15,500	77,400	79,200
MANGANESE	µg/L	176	99.5	94.4	309	307	219	215
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	1,870 J	1,930 J	1,780 J	672 J	658 J	10,700 J	10,400 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	23,800	21,900	21,700	26,300	26,300	225,000 J	257,000
VANADIUM (FUME OR DUST)	µg/L	50 U	0.63 J	50 U	50 U	50 U	0.75 J	50 U
ZINC	µg/L	5 J	60 U	60 U	60 U	60 U	60 U	2.4 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-509S	MW-509S	MW-510D	MW-510D	MW-510S	MW-510S	MW-511D
	Sample:	ME2HP9	ME2HQ0	ME2HX4	ME2HX5	ME2HX6	ME2HX7	ME2HT6
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	4/29/2005	4/29/2005	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/3/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	34.9 J	14 J	16.5 J	200 U	200 UJ
ARSENIC	µg/L	10 UJ	10 U	10 UJ	10 UJ	10 U	10 U	10 U
BARIUM	µg/L	200 U	200 UJ	200 U	200 U	200 U	200 U	230
CALCIUM METAL	µg/L	160,000	151,000	127,000	125,000	94,000	92,800	96,800
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 UJ	50 U	50 U	50 U	50 U	50 U
COPPER	µg/L	25 UJ	25 U	25 U	25 U	2 J	25 U	25 U
CYANIDE	µg/L	6 J		10 U		10 U		10 U
IRON	µg/L	531	306	2,730	498	772	358	2,410
LEAD	µg/L	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	35,900	34,000	55,600	55,200	25,300	24,900	37,700
MANGANESE	µg/L	369	364	51.2 J	49.5 J	268	268	108
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	10,800 J	9,850 J	7,320 J	7,380 J	12,300 J	11,600 J	5,080
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	122,000 J	126,000	131,000	131,000	57,400	55,600	52,500
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	1.1 J	0.91 J	50 U
ZINC	µg/L	60 U	9.6 J	60 U	60 U	60 U	60 U	3.7 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-511D	MW-511S	MW-511S	MW-512D	MW-512D	MW-512S	MW-512S
	Sample:	ME2HT7	ME2HT8	ME2HT9	ME2HT0	ME2HT1	ME2HS4	ME2HS5
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U
BARIUM	µg/L	221	200 UJ	200 UJ	337	314	200 UJ	200 UJ
CALCIUM METAL	µg/L	94,200	139,000	142,000	102,000	102,000	84,700	85,300
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 UJ	50 UJ	50 U	50 U	50 U	1 J
COPPER	µg/L	25 U	1.6 J	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L		10 U		10 U		10 U	
IRON	µg/L	1,490	100 U	100 U	3,190	172	134	100 U
LEAD	µg/L	10 U	10 UJ	10 UJ	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	36,700	39,900	40,500	40,000	40,000	26,100	26,400
MANGANESE	µg/L	101	795	807	75	72.3	475	480
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	3.2 J	2.9 J	40 U	40 U	40 U	2.5 J
POTASSIUM	µg/L	5,060	8,150	8,390	6,480	6,500	4,610 J	4,650 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	52,400	56,800	58,900	99,900	100,000	37,400	37,900
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	60 U	10.1 J	6.6 J	8.7 J	6.3 J	8 J	24.3 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-513D	MW-513D	MW-513S	MW-513S	MW-514D	MW-514D	MW-514S
	Sample:	ME2HS6	ME2HS7	ME2HS8	ME2HS9	ME2HY2	ME2HY3	ME2HY6
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/5/2005	5/5/2005	5/5/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	244	200 UJ	200 UJ	200 UJ	112 J	19.3 J	200 UJ
ARSENIC	µg/L	5 J	10 U	10 U	6.5 J	10 UJ	10 UJ	10 U
BARIUM	µg/L	215 J	200 U	200 U	200 U	312	272	200 U
CALCIUM METAL	µg/L	95,900	93,000	83,300	83,200	144,000	145,000	95,600
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	1.2 J
COPPER	µg/L	5.7 J	25 U	25 U	25 U	25 U	25 U	6.6 J
CYANIDE	µg/L	10 U		10 U		1.7 J		10 U
IRON	µg/L	5,180	663	2,030	931	8,220	549	100 U
LEAD	µg/L	10 U	10 U	10 U	10 U	10 U	4 J	10 UJ
MAGNESIUM	µg/L	32,600	31,900	20,900	20,900	55,700	55,500	34,800
MANGANESE	µg/L	157	142	591	594	127	127	15 U
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	4.9 J	40 U	40 U	6.9 J
POTASSIUM	µg/L	9,220 J	9,150	7,120	7,030	6,790 J	7,070 J	9,240 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	86,700	87,100	48,900	47,800	80,000	78,900	54,500
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	5.8 J	2.5 J	11.4 J	6.6 J	60 U	60 U	7.1 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-514S	MW-515D	MW-515D	MW-515S	MW-515S	MW-516D	MW-516D
	Sample:	ME2HY7	ME2HS0	ME2HS1	ME2HS2	ME2HS3	ME2HQ7	ME2HQ8
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/5/2005	5/2/2005	5/2/2005	5/2/2005	5/2/2005	5/2/2005	5/2/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ	200 UJ
ARSENIC	µg/L	10 U	70.1	47.4	22.3	23.9	343	307
BARIUM	µg/L	200 U	751 J	652 J	200 UJ	200 UJ	459 J	380 J
CALCIUM METAL	µg/L	94,900	85,700	86,500	88,400	88,000	35,100	34,400
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	9.4 J	8.2 J
COBALT	µg/L	1.3 J	50 UJ	50 UJ	50 U	50 U	3.6 J	2.9 J
COPPER	µg/L	6.4 J	3.9 J	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L		264		6.3 J		1,020	
IRON	µg/L	100 U	4,450	270	5,790	4,410	3,200	908
LEAD	µg/L	10 UJ	10 U	10 U	10 U	10 U	10 U	10 U
MAGNESIUM	µg/L	34,600	134,000	136,000	20,400	20,400	33,300	33,100
MANGANESE	µg/L	15 U	55.9 J	52.5 J	392	391	96	91.3
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	8 J	3.6 J	1.9 J	40 U	40 U	15.1 J	11 J
POTASSIUM	µg/L	9,070 J	10,400 J	10,500 J	6,250 J	6,220 J	13,900 J	14,200 J
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	7.9 J	35 U
SODIUM	µg/L	54,500	102,000	103,000	26,600	27,200	512,000	521,000
VANADIUM (FUME OR DUST)	µg/L	0.81 J	3 J	1.5 J	50 U	50 U	25.1 J	23 J
ZINC	µg/L	6.4 J	11.9 J	7.1 J	11.3 J	11.2 J	5.7 J	18.2 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	MW-516S	MW-516S	MW-517D	MW-517D	MW-517S	MW-517S	W-003
	Sample:	ME2HQ3	ME2HQ4	ME2HY0	ME2HY1	ME2HX8	ME2HX9	ME2HT2
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/2/2005	5/2/2005	5/5/2005	5/5/2005	5/4/2005	5/4/2005	5/3/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	200 UJ	86.5 J	17 J	22.1 J	13.3 J	296
ARSENIC	µg/L	12.2 J	14.3 J	10 UJ	10 UJ	10 U	10 U	8.3 J
BARIUM	µg/L	200 UJ	200 UJ	234	200 U	200 U	200 U	223
CALCIUM METAL	µg/L	151,000	146,000	146,000	138,000	100,000	100,000	123,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	3 J
COBALT	µg/L	3.9 J	4.2 J	50 U	50 U	50 U	50 U	50 UJ
COPPER	µg/L	25 U	25 U	1.6 J	25 U	25 U	25 U	27.2
CYANIDE	µg/L	10 U		18.7		10 U		10 U
IRON	µg/L	8,840	7,450	6,470	460	696	551	8,020
LEAD	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 UJ
MAGNESIUM	µg/L	34,500	33,500	49,000	47,200	22,300	21,800	34,800
MANGANESE	µg/L	587	582	203	186	267	262	201
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	8.3 J	8.2 J	40 U	40 U	40 U	40 U	2.1 J
POTASSIUM	µg/L	4,470 J	4,390 J	11,600 J	11,300 J	7,060 J	7,140 J	10,100
SELENIUM	µg/L	9.9 J	35 U	35 U	35 U	35 U	35 U	35 U
SODIUM	µg/L	46,100	46,800	195,000	189,000	78,500	78,600	143,000
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	1.7 J	1.7 J	50 U
ZINC	µg/L	7.9 J	7.2 J	60 U	60 U	60 U	60 U	9.8 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	W-003	W-004	W-004	W-005	W-005	W-006	W-006
	Sample:	ME2HT3	ME2HP4	ME2HP5	ME2HK3	ME2HK4	ME2HK1	ME2HK2
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/3/2005	4/29/2005	4/29/2005	4/26/2005	4/26/2005	4/26/2005	4/26/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	200 UJ	681 J	200 UJ	557	200 U	200 U	200 U
ARSENIC	µg/L	10 UJ	10 UJ	10 U	10 U	10 U	10 U	10 U
BARIUM	µg/L	200 UJ	200 U	200 UJ	285	259	487	486
CALCIUM METAL	µg/L	118,000	120,000	124,000	115,000	108,000	158,000	158,000
CHROMIUM, TOTAL	µg/L	10 U	0.87 J	10 U	10 U	10 U	1.9 J	10 U
COBALT	µg/L	50 UJ	50 U	50 UJ	50 U	50 U	50 UJ	50 UJ
COPPER	µg/L	25 U	41.1 J	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L		10 U		1 J		1.2 J	
IRON	µg/L	2,520	5,490	1,720	6,280	2,320	8,110	5,800
LEAD	µg/L	10 UJ	10 UJ	10 U	10 UJ	10 UJ	10 UJ	10 UJ
MAGNESIUM	µg/L	33,200	27,000	26,800	34,200	31,600	38,800	38,300
MANGANESE	µg/L	175	213	210	105	81.3	162	147
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	4.5 J	3.9 J
POTASSIUM	µg/L	9,700	8,680 J	8,170 J	3,110 J	2,960 J	7,120	7,160
SELENIUM	µg/L	35 U	35 U	35 U	35 U	35 U	35 UJ	35 UJ
SODIUM	µg/L	144,000	106,000 J	118,000	88,300	89,900	401,000	414,000
VANADIUM (FUME OR DUST)	µg/L	50 U	0.98 J	50 U	0.87 J	50 U	50 U	50 U
ZINC	µg/L	3.3 J	60 U	60 U	6.4 J	2.9 J	10 J	6.1 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	W-007	W-007	W-009	W-009	W-010	W-010	W-011
	Sample:	ME2HH8	ME2HH9	ME2HK5	ME2HK6	ME2HK9	ME2HL0	ME2HH0
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	4/25/2005	4/25/2005	4/26/2005	4/26/2005	4/27/2005	4/27/2005	4/25/2005
Metals								
ALUMINUM (FUME OR DUST)	µg/L	382 J	279 J	200 UJ	200 UJ	200 UJ	200 UJ	207 J
ARSENIC	µg/L	43.7	32.5	10 UJ	10 UJ	10 UJ	10 UJ	10 U
BARIUM	µg/L	200 U	200 U	200 U	200 U	200 U	200 U	200 U
CALCIUM METAL	µg/L	108,000	102,000	183,000	185,000	234,000	236,000	138,000
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U
COBALT	µg/L	0.96 J	50 U	50 U	50 U	50 U	50 U	50 UJ
COPPER	µg/L	25 U	25 U	25 U	25 U	25 U	25 U	25 U
CYANIDE	µg/L	1.5 J		21.6 J		83.6		40.4
IRON	µg/L	6,030	2,930	10,400	8,320	20,500	10,200	11,100
LEAD	µg/L	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ
MAGNESIUM	µg/L	44,100	41,100	46,500	47,200	52,700	53,000	32,700
MANGANESE	µg/L	165	128	199 J	197 J	179 J	174 J	163
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	2,850 J	2,730 J	5,620 J	5,590 J	9,380 J	9,220 J	5,880
SELENIUM	µg/L	35 U	35 U	35 U	35 U	10.7 J	35 U	35 UJ
SODIUM	µg/L	145,000	137,000	76,800	74,800	150,000	149,000	149,000
VANADIUM (FUME OR DUST)	µg/L	0.83 J	50 U	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	10.8 J	3.5 J	60 U	60 U	60 U	60 U	3.3 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-3
Appendix C
OMC Monitoring Well Samples
Metals

	Station:	W-011	W-012	W-012	W-013	W-013
	Sample:	ME2HH1	ME2HH2	ME2HH3	ME2HK7	ME2HK8
	Matrix:	Water	Water	Water	Water	Water
	Date:	4/25/2005	4/25/2005	4/25/2005	4/27/2005	4/27/2005
Metals						
ALUMINUM (FUME OR DUST)	µg/L	200 U	297 J	200 U	200 UJ	200 UJ
ARSENIC	µg/L	10 U	14.7 J	10 U	112	41.8
BARIUM	µg/L	200 U	200 U	200 U	200 U	200 U
CALCIUM METAL	µg/L	136,000	107,000	99,400	93,500	90,900
CHROMIUM, TOTAL	µg/L	10 U	10 U	10 U	3.9 J	10 U
COBALT	µg/L	50 UJ	50 U	50 U	50 U	50 U
COPPER	µg/L	25 U	25 U	25 U	2.4 J	25 U
CYANIDE	µg/L		8.2 J		10 U	
IRON	µg/L	2,370	3,580	140	11,000	1,560
LEAD	µg/L	10 UJ	10 UJ	10 UJ	10 U	10 U
MAGNESIUM	µg/L	32,400	24,000	21,500	16,800	17,000
MANGANESE	µg/L	161	239	195	336	319
MERCURY	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	µg/L	40 U	40 U	40 U	40 U	40 U
POTASSIUM	µg/L	6,150	3,990 J	3,860 J	2,440 J	2,360 J
SELENIUM	µg/L	35 UJ	35 U	35 U	35 U	35 U
SODIUM	µg/L	150,000	34,200	33,900	53,000	50,700
VANADIUM (FUME OR DUST)	µg/L	50 U	50 U	50 U	50 U	50 U
ZINC	µg/L	3.8 J	7.9 J	5 J	60 U	60 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-4
Appendix C
OMC Monitoring Well Samples
PCBs

	Station:	MW-501S	MW-505D	MW-510D	MW-512S	MW-517D	MW-517S	W-003	W-010
	Sample:	E2HJ9	E2HX2	E2HX4	E2HS4	E2HY0	E2HX8	E2HT2	E2HK9
	Matrix:	Water	Water	Water	Water	Water	Water	Water	Water
	Date:	4/26/2005	5/4/2005	5/4/2005	5/3/2005	5/5/2005	5/4/2005	5/3/2005	4/27/2005
PCBs									
PCB-1016 (AROCHLOR 1016)	µg/L	14	0.2 U	0.2 U	0.19 J	0.2 U	0.2 U	0.2 U	2
PCB-1232 (AROCHLOR 1232)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	110 J	0.2 U	0.2 U	0.2 U
PCB-1248 (AROCHLOR 1248)	µg/L	0.2 U	0.27	0.18 J	0.2 U	0.2 U	61 J	2.4 J	0.2 U
PCB-1254 (AROCHLOR 1254)	µg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1.5 J	0.2 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

	Station:	MW-003D	MW-003S	MW-011D	MW-011S	MW-014D	MW-014D	MW-014S	MW-015D	MW-015!
	Sample:	E2HM7	E2HN2	E2HQ5	E2HR4	E2HM1	E2HM3	E2HM5	E2HN0	E2HN8
		Water	Water	Water	Water	Water	Water, dup	Water	Water	Water
Matrix:	Date	4/28/2005	4/28/2005	5/2/2005	5/2/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005	4/29/200
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1,2,2-TETRACHLOROETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1,2-TRICHLORO-1,2,	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1,2-TRICHLOROETHANE	µg/L	2.5 UJ	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,1-DICHLOROETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.38 J	0.28 J	0.5 U	1.6
1,1-DICHLOROETHYLENE	µg/L	2.5 U	0.5 U	0.5 U	6.7	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,2,4-TRICHLOROBENZENE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,2-DICHLOROETHANE	µg/L	2.5 U	0.062 J	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.081
1,2-DICHLOROPROPANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,3-DICHLOROBENZENE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
1,4-DICHLOROBENZENE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
2-BUTANONE	µg/L	25 U	5 U	5 U	25 U	5 U	0.37 J	5 U	5 U	5
2-HEXANONE	µg/L	25 U	5 U	5 U	25 U	5 U	5 U	5 U	5 U	5
ACETONE	µg/L	33	5 U	5 U	25 U	5 U	1.9 J	5 U	5 U	5
BENZENE	µg/L	390 J	0.031 J	0.5 U	2.5 U	84 J	83 J	0.039 J	0.046 J	0.16
BROMODICHLOROMETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
BROMOFORM	µg/L	5.1 UJ	0.79 U	1.3 UJ	5.3 UJ	0.87 J	1.1 U	0.79 U	0.79 U	0.79
CARBON DISULFIDE	µg/L	2.5 U	0.11 J	0.5 U	2.5 U	0.081 J	0.11 J	0.5 U	0.5 U	0.5
CHLOROETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
CHLOROFORM	µg/L	2.5 U	0.059 J	0.5 U	2.5 U	0.049 J	0.5 U	0.048 J	0.061 J	0.052
CHLOROMETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
CIS-1,2-DICHLOROETHYLENE	µg/L	2.5 U	0.53	1.7	2,100 J	0.5 U	0.67	0.37 J	0.99	41
CYCLOHEXANE	µg/L	2.5 U	0.11 J	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
DIBROMOCHLOROMETHANE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
ETHYLBENZENE	µg/L	0.45 J	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
METHYL ACETATE	µg/L	2.5 U	0.5 U	0.5 U	7.2	0.5 U	0.5 U	0.5 U	0.5 U	0.5
METHYLCYCLOHEXANE	µg/L	2.5 U	0.1 J	0.5 U	2.5 U	0.14 J	0.5 U	0.5 U	0.17 J	0.5
METHYLENE CHLORIDE	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.19 J	0.5 U	0.5 U	0.5
TETRACHLOROETHYLENE(PCE)	µg/L	2.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5
TOLUENE	µg/L	22	0.5 U	0.5 U	1.3 J	0.067 J	0.079 J	0.5 U	0.03 J	0.5
TRANS-1,2-DICHLOROETHENE	µg/L	2.5 U	0.19 J	0.5 U	25	0.5 U	0.5 U	0.5 U	0.5 U	2.2
TRICHLOROETHYLENE	µg/L	2.5 U	0.5 U	0.5 U	2.1 J	0.5 U	0.5 U	0.5 U	0.5 U	20
VINYL CHLORIDE	µg/L	2.5 U	0.86	27	120 J	1.8	1.8	0.5 U	0.5 U	6
XYLENES, TOTAL	µg/L	4	0.5 U	0.5 U	0.87 J	0.5 U	0.5 U	0.5 U	0.5 U	0.5

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

Matrix:	Station: Sample: Date	S 5	MW-015S E2HP0 Water, dup 4/29/2005	MW-100 E2HL3 Water 4/27/2005	MW-101 E2HL5 Water 4/27/2005	MW-102 E2HL9 Water 4/28/2005	MW-500D E2HH4 Water 4/25/2005	MW-500D E2HH6 Water, dup 4/25/2005	MW-500S E2HJ5 Water 4/26/2005	MW-501D E2HJ7 Water 4/26/2005
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLORO-1,2,	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	µg/L	U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ
1,1-DICHLOROETHANE	µg/L		1.6	0.5 U	0.065 J	0.089 J	0.13 J	0.12 J	0.5 U	0.19 J
1,1-DICHLOROETHYLENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	µg/L	J	0.5 U	0.067 J	0.5 U	0.5 U	0.1 J	0.1 J	0.5 U	0.5 U
1,2-DICHLOROPROPANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	µg/L	U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-HEXANONE	µg/L	U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	µg/L	U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
BENZENE	µg/L	J	0.16 J	0.047 J	0.042 J	1.3 J	0.7	0.64	0.076 J	0.55
BROMODICHLOROMETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.15 J	0.5 U	0.5 U	0.5 U
BROMOFORM	µg/L	U	0.79 U	1.2 UJ	1.2 UJ	0.79 U	1.2 UJ	1.2 UJ	1.2 UJ	1.2 UJ
CARBON DISULFIDE	µg/L	U	0.5 U	0.14 J	0.14 J	0.11 J	0.23 J	0.24 J	0.2 J	0.19 J
CHLOROETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.55	0.5 U	0.24 J
CHLOROFORM	µg/L	J	0.5 U	0.5 U	0.5 U	0.057 J	0.52	0.5 U	0.5 U	0.5 U
CHLOROMETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L	J	47 J	0.5 U	0.5 U	0.47 J	25	25	69	0.5 U
CYCLOHEXANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.079 J	0.5 U	0.5 U	0.5 U
ETHYLBENZENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYL ACETATE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
METHYLCYCLOHEXANE	µg/L	U	0.087 J	0.5 U	0.1 J	0.5 U	0.24 J	0.18 J	0.5 U	0.22 J
METHYLENE CHLORIDE	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHYLENE(PCE)	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
TOLUENE	µg/L	U	0.5 U	0.5 U	0.5 U	0.033 J	0.057 J	0.05 J	0.5 U	0.055 J
TRANS-1,2-DICHLOROETHENE	µg/L		2.3	0.5 U	0.5 U	0.21 J	0.7	0.66	1.5	0.5 U
TRICHLOROETHYLENE	µg/L		19	0.5 U	0.5 U	0.081 J	0.5 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L		6.1	0.5 U	0.5 U	0.5 U	9.2	9.3	14	0.5 U
XYLENES, TOTAL	µg/L	U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

Matrix:	Station: / Sample: / Date	MW-501S	MW-502D	MW-502S	MW-503D	MW-503D	MW-503S	MW-504D	MW-504S	MW-505I
	Station:	E2HJ9	E2HZ8	E2HZ2	E2HY4	E2HY8	E2HZ0	E2HW0	E2HW2	E2HX2
	Sample:	Water	Water	Water	Water	Water, dup	Water	Water	Water	Water
	Date	4/26/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/4/2005	5/4/2005	5/4/2005
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	2,900	0.5 U	10 U	0.5
1,1,2,2-TETRACHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,1,2-TRICHLORO-1,2,	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,1,2-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,1-DICHLOROETHANE	µg/L	6.1	1.5	0.76	200 U	250 U	480	0.5 U	10 U	0.14
1,1-DICHLOROETHYLENE	µg/L	0.5 U	0.71	0.5 U	420	480	300	7.7	6.2 J	0.5
1,2,4-TRICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,2-DICHLOROETHANE	µg/L	0.096 J	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,2-DICHLOROPROPANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
1,3-DICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.11
1,4-DICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
2-BUTANONE	µg/L	5 U	5 U	5 U	2,000 U	2,500 U	1,000 U	5 UJ	100 U	5
2-HEXANONE	µg/L	5 U	5 U	5 U	2,000 U	2,500 U	1,000 U	5 U	100 U	5
ACETONE	µg/L	5 U	5 U	5 U	2,000 U	2,500 U	1,000 U	5 UJ	100 U	5
BENZENE	µg/L	0.5 U	0.5 U	0.12 J	200 U	250 U	100 U	0.5 U	10 U	0.5
BROMODICHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
BROMOFORM	µg/L	0.83	1.4 U	1.4 U	1,200 UJ	1,500 UJ	600 UJ	0.89 U	30 U	0.89
CARBON DISULFIDE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.12 J	10 U	0.5
CHLOROETHANE	µg/L	0.5 U	0.5 U	1.9	200 U	250 U	100 U	0.5 U	10 U	0.5
CHLOROFORM	µg/L	0.5 U	0.5 U	0.5 U	40 J	250 U	140	0.5 U	10 U	0.5
CHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
CIS-1,2-DICHLOROETHYLENE	µg/L	24	91	2	250,000 J	280,000 J	51,000 J	1,000	6,200 J	9
CYCLOHEXANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
DIBROMOCHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	200 UJ	250 UJ	100 UJ	0.5 U	10 U	0.5
ETHYLBENZENE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
METHYL ACETATE	µg/L	0.5 U	0.5 U	0.5 U	200 UJ	250 UJ	100 UJ	0.5 U	10 U	0.5
METHYLCYCLOHEXANE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.25 J	10 U	0.5
METHYLENE CHLORIDE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
TETRACHLOROETHYLENE(PCE)	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	100 U	0.5 U	10 U	0.5
TOLUENE	µg/L	0.5 U	0.5 U	0.5 U	200 U	250 U	51 J	0.12 J	0.58 J	0.04
TRANS-1,2-DICHLOROETHENE	µg/L	0.92	2.2	0.5 U	460	500	130	13	27	0.1
TRICHLOROETHYLENE	µg/L	0.18 J	0.5 U	0.45 J	570	360 J	100 U	43	420	2.4
VINYL CHLORIDE	µg/L	1	8	0.74	12,000 J	12,000 J	10,000 J	980 J	1,100	0.67
XYLENES, TOTAL	µg/L	0.5 U	0.5 U	0.07 J	200 U	250 U	100 U	0.5 U	10 U	0.16

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

		D	MW-505S	MW-506D	MW-506D	MW-506S	MW-507D	MW-507S	MW-508D	MW-508S
	Station:		E2HX0	E2HW4	E2HW6	E2HW8	E2HR6	E2HR8	E2HL1	E2HL7
	Sample:		Water	Water	Water, dup	Water	Water	Water	Water	Water
Matrix:	Date	5	5/4/2005	5/4/2005	5/4/2005	5/4/2005	5/2/2005	5/2/2005	4/27/2005	4/27/2005
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLORO-1,2,	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 UJ	0.5 UJ
1,1-DICHLOROETHANE	µg/L	J	0.13 J	100 U	100 U	0.71	1 U	0.5 U	0.5 U	0.5 U
1,1-DICHLOROETHYLENE	µg/L	U	0.5 U	210	210	0.5 U	1 U	0.12 J	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE	µg/L	J	0.09 J	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
1,4-DICHLOROBENZENE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
2-BUTANONE	µg/L	U	5 U	1,000 U	1,000 U	5 U	10 U	5 U	5 U	5 U
2-HEXANONE	µg/L	U	5 U	1,000 U	1,000 U	5 U	10 U	5 U	5 U	5 U
ACETONE	µg/L	U	5 U	1,000 U	1,000 U	5 U	10 U	5 U	5 U	5 U
BENZENE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.046 J	0.05 J
BROMODICHLOROMETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.13 J	0.5 U
BROMOFORM	µg/L	U	1.9 U	600 UJ	580 UJ	0.89 U	2.4 UJ	1.3 UJ	1.2 UJ	1.2 UJ
CARBON DISULFIDE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
CHLOROETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
CHLOROFORM	µg/L	U	0.5 U	100 U	21 J	0.5 U	0.39 J	0.5 U	0.57	0.5 U
CHLOROMETHANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L		6.9 J	89,000	90,000 J	2.8	720	56	0.5 U	0.5 U
CYCLOHEXANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	µg/L	U	0.5 U	100 UJ	100 UJ	0.5 U	1 U	0.5 U	0.065 J	0.5 U
ETHYLBENZENE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
METHYL ACETATE	µg/L	U	0.5 UJ	100 UJ	100 UJ	0.5 U	1 U	0.5 U	0.5 U	0.5 U
METHYLCYCLOHEXANE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.16 J	0.5 U
METHYLENE CHLORIDE	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
TETRACHLOROETHYLENE(PCE)	µg/L	U	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U
TOLUENE	µg/L	J	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.061 J	0.5 U
TRANS-1,2-DICHLOROETHENE	µg/L	J	0.14 J	170	170	0.5 U	31	2.7	0.5 U	0.5 U
TRICHLOROETHYLENE	µg/L		1.7	100 U	100 U	3.8	1 U	0.5 U	0.5 U	0.5 U
VINYL CHLORIDE	µg/L		0.43 J	16,000	16,000 J	19	140 J	2.1 J	0.5 U	0.5 U
XYLENES, TOTAL	µg/L	J	0.5 U	100 U	100 U	0.5 U	1 U	0.5 U	0.5 U	0.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

	Station:	MW-509D	MW-509S	MW-510D	MW-510S	MW-511D	MW-511S	MW-512D	MW-512S	MW-513I
	Sample:	E2HP6	E2HP9	E2HX4	E2HX6	E2HT6	E2HT8	E2HT0	E2HS4	E2HS6
		Water	Water	Water	Water	Water	Water	Water	Water	Water
Matrix:	Date	4/29/2005	4/29/2005	5/4/2005	5/4/2005	5/3/2005	5/3/2005	5/3/2005	5/3/2005	5/3/200!
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,1,2,2-TETRACHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,1,2-TRICHLORO-1,2,	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	5 UJ	5 UJ	0.5
1,1,2-TRICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,1-DICHLOROETHANE	µg/L	0.15 J	0.44 J	0.5 U	0.28 J	0.5 U	0.5 U	5 U	5 U	0.64
1,1-DICHLOROETHYLENE	µg/L	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	11 J	19 J	0.5
1,2,4-TRICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,2-DICHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	0.87 J	0.5
1,2-DICHLOROPROPANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,3-DICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
1,4-DICHLOROBENZENE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
2-BUTANONE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	50 U	50 U	5
2-HEXANONE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	50 U	50 U	5
ACETONE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	50 U	50 U	5
BENZENE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	2.6 J	0.61 J	0.5
BROMODICHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
BROMOFORM	µg/L	0.79 U	0.79 U	0.89 U	0.89 U	1.1 UJ	1.1 UJ	7 UJ	9.2 UJ	1.1
CARBON DISULFIDE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
CHLOROETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
CHLOROFORM	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.29 J	0.67	5 U	5 U	0.5
CHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
CIS-1,2-DICHLOROETHYLENE	µg/L	0.5 U	0.5 U	4.7	11	20	150	2,700	2,100	0.75
CYCLOHEXANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
DIBROMOCHLOROMETHANE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 UJ	5 U	0.5
ETHYLBENZENE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
METHYL ACETATE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
METHYLCYCLOHEXANE	µg/L	0.14 J	0.5 U	0.24 J	0.14 J	0.5 U	0.5 U	5 U	5 U	0.5
METHYLENE CHLORIDE	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.9 J	1.1 J	0.5
TETRACHLOROETHYLENE(PCE)	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
TOLUENE	µg/L	0.091 J	0.5 U	0.06 J	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5
TRANS-1,2-DICHLOROETHENE	µg/L	0.5 U	0.5 U	0.08 J	0.19 J	0.19 J	3.3	3.8 J	17	0.5
TRICHLOROETHYLENE	µg/L	0.5 U	0.15 J	0.92	2.4	2.7	430	11	780	0.5
VINYL CHLORIDE	µg/L	0.5 U	0.5 U	2.2	5.1	68	20	1,100 J	20	1.2
XYLENES, TOTAL	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-5
Appendix C
OMC Monitoring Well Samples
Volatile Organic Compounds

		D	MW-513S	MW-514D	MW-514S	MW-515D	MW-515S	MW-516D	MW-516S	MW-517D
	Station:		E2HS8	E2HY2	E2HY6	E2HS0	E2HS2	E2HQ7	E2HQ3	E2HY0
	Sample:		Water	Water	Water	Water	Water	Water	Water	Water
Matrix:	Date5		5/3/2005	5/5/2005	5/5/2005	5/2/2005	5/2/2005	5/2/2005	5/2/2005	5/5/2005
Volatile Organic Compounds										
1,1,1-TRICHLOROETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,1,2,2-TETRACHLOROETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,1,2-TRICHLORO-1,2,	µg/L	UJ	0.5 UJ	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,1,2-TRICHLOROETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 UJ
1,1-DICHLOROETHANE	µg/L		0.15 J	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.11 J
1,1-DICHLOROETHYLENE	µg/L	UJ	0.5 UJ	11 J	1.9 J	1 U	0.5 U	1 U	0.5 U	0.5 U
1,2,4-TRICHLOROBENZENE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,2-DICHLOROETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,2-DICHLOROPROPANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
1,3-DICHLOROBENZENE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.25 J
1,4-DICHLOROBENZENE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.07 J
2-BUTANONE	µg/L	U	5 U	200 U	25 U	10 U	5 U	10 U	5 U	5 U
2-HEXANONE	µg/L	U	5 U	200 U	25 U	10 U	5 U	10 U	5 U	5 U
ACETONE	µg/L	U	5 U	200 U	25 U	10 U	5 U	10 U	5 U	5 U
BENZENE	µg/L	U	0.5 U	20 U	2.5 U	380	1.9	410 J	0.5 U	0.5 U
BROMODICHLOROMETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
BROMOFORM	µg/L	UJ	1.1 UJ	55 U	9.1 U	2 UJ	1.3 UJ	1.8 UJ	1.3 UJ	1.9 U
CARBON DISULFIDE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
CHLOROETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
CHLOROFORM	µg/L	U	0.5 U	20 U	2.5 U	0.3 J	0.5 U	1 U	0.5 U	0.5 U
CHLOROMETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
CIS-1,2-DICHLOROETHYLENE	µg/L		2	4,200 J	1,100 J	1 U	0.11 J	1 U	0.2 J	0.8 J
CYCLOHEXANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
DIBROMOCHLOROMETHANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
ETHYLBENZENE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
METHYL ACETATE	µg/L	U	0.5 U	20 UJ	2.5 UJ	1 U	0.5 U	1 U	0.5 U	0.5 U
METHYLCYCLOHEXANE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
METHYLENE CHLORIDE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
TETRACHLOROETHYLENE(PCE)	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U
TOLUENE	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	75	0.5 U	0.5 U
TRANS-1,2-DICHLOROETHENE	µg/L	U	0.5 U	16 J	5.7	1 U	0.5 U	1 U	0.5 U	0.17 J
TRICHLOROETHYLENE	µg/L	U	0.5 U	810	970	1 U	0.5 U	1 U	0.5 U	0.28 J
VINYL CHLORIDE	µg/L		0.5 U	2,600 J	200 J	1 U	0.5 U	1 U	0.5 U	0.5 U
XYLENES, TOTAL	µg/L	U	0.5 U	20 U	2.5 U	1 U	0.5 U	1 U	0.5 U	0.5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-6
Appendix C
OMC Monitoring Well Samples
Semivolatile Organic Compounds

	Station:	MW-003D	MW-011S	MW-014D	MW-014D	MW-014S	MW-015D	MW-102
	Sample:	E2HM7	E2HR4	E2HM1	E2HM3	E2HM5	E2HN0	E2HL9
	Matrix:	Water	Water	Water	Water, dup	Water	Water	Water
	Date:	4/28/2005	5/2/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005	4/28/2005
Semivolatile Organic Compounds								
2,4-DIMETHYLPHENOL	µg/L	2,300 J	5 U	5 U	5 U	5 U	5 U	5 U
2-METHYLPHENOL (O-CRESOL)	µg/L	2,300 J	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL (P-CRESOL)	µg/L		5 U	3.3 J	9.2	6.4	14	12
ACENAPHTHENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETOPHENONE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZOFURAN	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
DI-N-BUTYL PHTHALATE	µg/L	50 U	0.65 J	1.5 J	0.82 J	5 U	0.73 J	5 U
FLUORANTHENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
FLUORENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROPHENOL	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENOL	µg/L	140	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE	µg/L	50 U	5 U	5 U	5 U	5 U	5 U	5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-6
Appendix C
OMC Monitoring Well Samples
Semivolatile Organic Compounds

	Station:	MW-500D	MW-503D	MW-503S	MW-505D	MW-505S	MW-506D	MW-506D
	Sample:	E2HH4	E2HY8	E2HZ0	E2HX2	E2HX0	E2HW4	E2HW6
	Matrix:	Water	Water	Water	Water	Water	Water	Water, dup
	Date:	4/25/2005	5/5/2005	5/5/2005	5/4/2005	5/4/2005	5/4/2005	5/4/2005
Semivolatile Organic Compounds								
2,4-DIMETHYLPHENOL	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-METHYLPHENOL (O-CRESOL)	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL (P-CRESOL)	µg/L	5 U	5 U	28	5 U	5 U	5 U	5 U
ACENAPHTHENE	µg/L	5 U	5 U	5 U	5 U	9.5	5 U	5 U
ACETOPHENONE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE	µg/L	5 U	5 U	5 U	5 U	2.6 J	5 U	5 U
DIBENZOFURAN	µg/L	5 U	5 U	5 U	5 U	2.7 J	5 U	5 U
DI-N-BUTYL PHTHALATE	µg/L	0.55 J	0.58 J	5 U	0.51 J	5 U	0.7 J	0.95 J
FLUORANTHENE	µg/L	5 U	5 U	5 U	5 U	5.5	5 U	5 U
FLUORENE	µg/L	5 U	5 U	5 U	5 U	7.6	5 U	5 U
PENTACHLOROPHENOL	µg/L	5 U	5 U	0.96 J	5 U	5 U	5 U	5 U
PHENANTHRENE	µg/L	5 U	5 U	5 U	5 U	29	5 U	5 U
PHENOL	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE	µg/L	5 U	5 U	5 U	5 U	3.1 J	5 U	5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-6
Appendix C
OMC Monitoring Well Samples
Semivolatile Organic Compounds

	Station:	MW-506S	MW-507S	MW-508D	MW-510D	MW-515D	MW-515S	MW-516D
	Sample:	E2HW8	E2HR8	E2HL1	E2HX4	E2HS0	E2HS2	E2HQ7
	Matrix:	Water	Water	Water	Water	Water	Water	Water
	Date:	5/4/2005	5/2/2005	4/27/2005	5/4/2005	5/2/2005	5/2/2005	5/2/2005
Semivolatile Organic Compounds								
2,4-DIMETHYLPHENOL	µg/L	5 U	5 U	5 U	5 U	3.6 J	5 U	3,000
2-METHYLPHENOL (O-CRESOL)	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	1,000
4-METHYLPHENOL (P-CRESOL)	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	57
ACENAPHTHENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
ACETOPHENONE	µg/L	5 U	5 U	5 U	5 U	1.4 J	5 U	5 U
ANTHRACENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZOFURAN	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
DI-N-BUTYL PHTHALATE	µg/L	0.53 J	0.94 J	0.51 J	0.61 J	5 U	1.5 J	5 U
FLUORANTHENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
FLUORENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROPHENOL	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U
PHENOL	µg/L	5 U	5 U	5 U	5 U	4.5 J	5 U	5 U
PYRENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-6
Appendix C
OMC Monitoring Well Samples
Semivolatile Organic Compounds

	Station:	MW-517D	MW-517S	W-003	W-005	W-010	W-011
	Sample:	E2HY0	E2HX8	E2HT2	E2HK3	E2HK9	E2HH0
	Matrix:	Water	Water	Water	Water	Water	Water
	Date:	5/5/2005	5/4/2005	5/3/2005	4/26/2005	4/27/2005	4/25/2005
Semivolatile Organic Compounds							
2,4-DIMETHYLPHENOL	µg/L	4.5 J	2.9 J	5 U	5 U	5 U	5 U
2-METHYLPHENOL (O-CRESOL)	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYLPHENOL (P-CRESOL)	µg/L	2.9 J	5 U	5 U	5 U	5 U	5 U
ACENAPHTHENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ACETOPHENONE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
ANTHRACENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
DIBENZOFURAN	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
DI-N-BUTYL PHTHALATE	µg/L	5 U	5 U	0.85 J	0.53 J	0.67 J	0.59 J
FLUORANTHENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
FLUORENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
PENTACHLOROPHENOL	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
PHENANTHRENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
PHENOL	µg/L	5 U	5 U	5 U	5 U	5 U	5 U
PYRENE	µg/L	5 U	5 U	5 U	5 U	5 U	5 U

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-003D	MW-003S	MW-011D	MW-011S	MW-014D	MW-014D
	Station:	05CK29-22	05CK29-24	05CK29-32	05CK29-34	05CK29-19	05CK29-20
	Sample:	Water	Water	Water	Water	Water	Water, dup
	Date:	4/28/2005	4/28/2005	5/2/2005	5/2/2005	4/28/2005	4/28/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	2,300,000	270,000	370,000	360,000	350,000	340,000
CHLORIDE (AS CL)	µg/L	1,900,000	43,000	380,000	43,000	1,400,000	1,500,000
ETHANE	µg/L	25 U	2.5 U	0.5 U	2.5 U	4.7 J	2.8 J
ETHYLENE	µg/L	37 J	2.5 U	1.4 J	2.5 J	2.5 U	2.5 U
METHANE	µg/L	8,200	470	220	160	300	300
NITROGEN, NITRATE (AS N)	µg/L	40 U	40 U	100 J	40 U	40 U	40 U
NITROGEN, NITRITE	µg/L	300 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	2,900	77,000	110,000	53,000	72,000	72,000
SULFIDE	µg/L	4,000	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	160,000	4,000	5,200	2,800	4,400	5,000

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-014S	MW-015D	MW-015S	MW-015S	MW-100	MW-101
	Station:	05CK29-21	05CK29-23	05CK29-26	05CK29-27	05CK29-15	05CK29-16
	Sample:	Water	Water	Water	Water, dup	Water	Water
	Date:	4/28/2005	4/28/2005	4/29/2005	4/29/2005	4/27/2005	4/27/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	320,000	400,000	320,000	310,000	230,000	320,000
CHLORIDE (AS CL)	µg/L	120,000	130,000	17,000	17,000	14,000	28,000
ETHANE	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 J	4.9 J
ETHYLENE	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
METHANE	µg/L	71	68	63	63	820	390
NITROGEN, NITRATE (AS N)	µg/L	40 U	40 U	90 J	40 U	91 J	40 U
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	47,000	410,000	48,000	48,000	8,100	14,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	36,00	4,300	4,200	3,800	3,500	2,700

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: Sample: Date:	MW-102 05CK29-18 Water 4/28/2005	MW-500D 05CK29-03 Water 4/25/2005	MW-500D 05CK29-04 Water, dup 4/25/2005	MW-500S 05CK29-06 Water 4/26/2005	MW-501D 05CK29-07 Water 4/26/2005	MW-501S 05CK29-08 Water 4/26/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	330,000	290,000	290,000	190,000	350,000	280,000
CHLORIDE (AS CL)	µg/L	50,000	240,000	450,000	30,000	61,000	210,000
ETHANE	µg/L	50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U
ETHYLENE	µg/L	50 U	0.5 U	0.5 U	2.5 U	2.5 U	0.5 U
METHANE	µg/L	1,200	30	28	41	280	5.9
NITROGEN, NITRATE (AS N)	µg/L	190	40 U	97 J	460	40 U	170
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	770	60 U	60 U
SULFATE (AS SO4)	µg/L	24,000	120,000	110,000	57,000	39,000	130,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	2,500 J	8,000	8,900	10,000	4,800	4,100

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-502D	MW-502S	MW-503D	MW-503D	MW-503S	MW-504D
	Station:	05CK29-65	05CK29-64	05CK29-60	05CK29-63	05CK29-62	05CK29-48
	Sample:	Water	Water	Water	Water, dup	Water	Water
	Date:	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/5/2005	5/4/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	390,000	440,000	360,000	340,000	470,000	440,000
CHLORIDE (AS CL)	µg/L	250,000	120,000	490,000	580,000	140,000	280,000
ETHANE	µg/L	13	310	21	21	250	4.5 J
ETHYLENE	µg/L	2.5 U	14	260	260	290	140
METHANE	µg/L	64	3,100	1,200	1,200	4,100	130
NITROGEN, NITRATE (AS N)	µg/L	40 U	99 J	40 U	93 J	100 J	40 U
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	480,000	47,000	1,100,000	1,200,000	19,000	210,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	4,500	9,500	13,000	13,000	40,000	13,000

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-504S 05CK29-49 Water 5/4/2005	MW-505D 05CK29-53 Water 5/4/2005	MW-505S 05CK29-54 Water 5/4/2005	MW-506D 05CK29-50 Water 5/4/2005	MW-506D 05CK29-51 Water, dup 5/4/2005	MW-506S 05CK29-52 Water 5/4/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	460,000	370,000	520,000	370,000	350,000	450,000
CHLORIDE (AS CL)	µg/L	110,000	140,000	180,000	240,000	240,000	140,000
ETHANE	µg/L	79	3.9 J	160	12	9.9	94
ETHYLENE	µg/L	51	120	2.5 U	570	560	17
METHANE	µg/L	85	450	3,400	420	340	1,100
NITROGEN, NITRATE (AS N)	µg/L	40 U	92 J	40 U	100 J	96 J	1,100
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	59,000	300 U	8,000	250,000	250,000	29,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	8,700	3,200	9,700	4,400	4,400	3,900

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-507D 05CK29-35 Water 5/2/2005	MW-507S 05CK29-36 Water 5/2/2005	MW-508D 05CK29-12 Water 4/27/2005	MW-508S 05CK29-17 Water 4/27/2005	MW-509D 05CK29-25 Water 4/29/2005	MW-509S 05CK29-30 Water 4/29/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	310,000	210,000	230,000	220,000	340,000	320,000
CHLORIDE (AS CL)	µg/L	75,000	6,500	28,000	75,000	620,000	260,000
ETHANE	µg/L	4.6 J	2.5 U	2.6 J	9.5	2.5 U	0.5 U
ETHYLENE	µg/L	2.5 U	2.5 U	1 U	2.5 U	2.5 U	0.5 U
METHANE	µg/L	350	320	30	61	47	9.1 J
NITROGEN, NITRATE (AS N)	µg/L	40 U	40 U	91 J	40 U	110 J	89 J
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	61,000	58,000	33,000	15,000	65,000	130,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	3,100	2,700	4,700	1,500 J	2,900	2,500 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: Sample: Date:	MW-510D 05CK29-55 Water 5/4/2005	MW-510S 05CK29-56 Water 5/4/2005	MW-511D 05CK29-45 Water 5/3/2005	MW-511S 05CK29-46 Water 5/3/2005	MW-512D 05CK29-42 Water 5/3/2005	MW-512S 05CK29-39 Water 5/3/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	380,000	330,000	400,000	450,000	490,000	340,000
CHLORIDE (AS CL)	µg/L	310,000	83,000	86,000	55,000	150,000	11,000
ETHANE	µg/L	2.5 U	3.6 J	5.8 J	2.6 J	2.5 U	3.4 J
ETHYLENE	µg/L	2.5 U	2.5 U	2.5 U	2.5 U	110	2.5 U
METHANE	µg/L	150	840	2,700	170	3,300	43
NITROGEN, NITRATE (AS N)	µg/L	90 J	1,900	40 U	940	40 U	230
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	56,000	300 U	11,000	140,000	3,000	49,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	3,400	4,000	4,400	2,100 J	16,000	2,600 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-513D	MW-513S	MW-514D	MW-514S	MW-515D	MW-515S
	Station:	05CK29-40	05CK29-41	05CK29-59	05CK29-61	05CK29-37	05CK29-38
	Sample:	Water	Water	Water	Water	Water	Water
	Date:	5/3/2005	5/3/2005	5/5/2005	5/5/2005	5/2/2005	5/2/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	360,000	270,000	460,000	370,000	1,200,000	270,000
CHLORIDE (AS CL)	µg/L	170,000	63,000	210,000	44,000	700,000	47,000
ETHANE	µg/L	2.5 U	2.5 U	49	5.7 J	25 U	2.5 U
ETHYLENE	µg/L	2.5 U	2.5 U	180	6.6 J	25 U	2.5 U
METHANE	µg/L	790	240	2,500	70	670	48
NITROGEN, NITRATE (AS N)	µg/L	89 J	40 U	40 U	840	40 U	90 J
NITROGEN, NITRITE	µg/L	60 U	60 U	60 U	60 U	1,200 U	60 U
SULFATE (AS SO4)	µg/L	3,900	69,000	61,000	67,000	140,000	51,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,600 J	1,000 U
TOTAL ORGANIC CARBON	µg/L	3,800	2,500 J	5,600	4,800	34,000	4,700

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	MW-516D	MW-516S	MW-517D	MW-517S	W-003	W-004
	Station:	05CK29-33	05CK29-31	05CK29-58	05CK29-57	05CK29-43	05CK29-29
	Sample:	Water	Water	Water	Water	Water	Water
	Date:	5/2/2005	5/2/2005	5/5/2005	5/4/2005	5/3/2005	4/29/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	2,100,000	360,000	380,000	320,000	340,000	300,000
CHLORIDE (AS CL)	µg/L	1,900,000	48,000	390,000	120,000	250,000	190,000
ETHANE	µg/L	500 U	0.5 U	2.5 U	2.5 J	2.5 U	1.4 J
ETHYLENE	µg/L	500 U	0.5 U	2.5 U	2.5 U	2.5 U	11
METHANE	µg/L	6,400	7.5	88	380	66	150
NITROGEN, NITRATE (AS N)	µg/L	40 U	1,100	40 U	92 J	150	89 J
NITROGEN, NITRITE	µg/L	12,000 U	60 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	760 J	200,000	97,000	52,000	95,000	100,000
SULFIDE	µg/L	4,600	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	75,000	1,200 J	2,900	2,600 J	2,600 J	2,500 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

Matrix:	Station: / Sample: / Date:	W-005	W-006	W-007	W-009	W-010	W-011
	Station:	05CK29-10	05CK29-09	05CK29-05	05CK29-11	05CK29-13	05CK29-01
	Sample:	Water	Water	Water	Water	Water	Water
	Date:	4/26/2005	4/26/2005	4/25/2005	4/26/2005	4/27/2005	4/25/2005
Wet Chemistry							
ALKALINITY, TOTAL (AS CACO3)	µg/L	320,000	250,000	320,000	270,000	340,000	370,000
CHLORIDE (AS CL)	µg/L	200,000	790,000	240,000	160,000	300,000	230,000
ETHANE	µg/L	1 U	5 U	50 J	6.1 J	2.5 U	1 U
ETHYLENE	µg/L	10	110	50 U	18	2.5 U	1 U
METHANE	µg/L	29	130	960	49	49	30
NITROGEN, NITRATE (AS N)	µg/L	40 U	40 U	40 U	40 U	88 J	40 U
NITROGEN, NITRITE	µg/L	40 U	40 U	60 U	60 U	60 U	60 U
SULFATE (AS SO4)	µg/L	48,000	70,000	78,000	300,000	360,000	99,000
SULFIDE	µg/L	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	4,000	3,400	4,400	3,500	4,800	3,800

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 3-7
Appendix C
OMC Monitoring Well Samples
General Chemistry

		W-012	W-013
	Station:	05CK29-02	05CK29-14
	Sample:	Water	Water
Matrix:	Date:	4/25/2005	4/27/2005
Wet Chemistry			
ALKALINITY, TOTAL (AS CACO3)	µg/L	230,000	280,000
CHLORIDE (AS CL)	µg/L	58,000	90,000
ETHANE	µg/L	0.63 J	3.7 J
ETHYLENE	µg/L	1.6	2.5 U
METHANE	µg/L	5	630
NITROGEN, NITRATE (AS N)	µg/L	86 J	40 U
NITROGEN, NITRITE	µg/L	60 U	60 U
SULFATE (AS SO4)	µg/L	110,000	12,000
SULFIDE	µg/L	1,000 U	1,000 U
TOTAL ORGANIC CARBON	µg/L	4,500	2,400 J

Qualifier Key: " " - detected; "J" - detected, estimated; "R" - rejected; "U" - Not Detected

Table 4-1
Appendix C
OMC Soil Gas and Indoor Air
Volatile Organic Compounds

	Station:		AA-002	AA-003	AA-004	AA-BKG	GS-001	GS-002	GS-003	GS-004	GS-005
	Sample:	AA-001	05CK14-08	05CK14-09	05CK14-10	05CK14-11	05CK14-02	05CK14-05	05CK14-01	05CK14-03	05CK14-04
	Interval:	05CK14-07	0 - 0	0 - 0	0 - 0	0 - 0	2 - 2	2 - 2	1.3 - 1.3	2 - 2	3 - 3
	Matrix:	0 - 0	Air	Air	Air	Air	Air	Air	Air	Air	Air
	Date:	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005	2/23/2005
Volatile Organic Compounds											
1,1,1-TRICHLOROETHANE	ppbv	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.2	0.67
2-BUTANONE	ppbv	1.1	0.76	1.2	0.55	0.5 U	3.8	4.5	11	2.1	5.7
2-HEXANONE	ppbv	0.5 U	0.5 U	0.5 U	1	0.5 U	0.5 U	0.5 U	2.5 U	0.5 U	0.5 U
ACETONE	ppbv	11	6.8	8.9	5 U	5 U	34	31	25 U	21	49
BENZENE	ppbv	6.6	6.8	6.5	0.52	0.23	4.3	4.6	8.8	5.7	5.1
CARBON DISULFIDE	ppbv	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.82	0.5 U	2.5 U	2.1	0.81
CHLOROMETHANE	ppbv	0.5 U	0.55	0.59	0.55	0.5 U	0.61	0.6	2.5 U	1.1	0.53
CIS-1,2-DICHLOROETHYLENE	ppbv	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.49	0.5	1 U	0.2 U	0.2 U
ETHYLBENZENE	ppbv	2.1	0.49	2.1	0.51	0.2 U	1.7	1.8	2.1	1.6	2.1
O-XYLENE (1,2-DIMETHYLBENZENE)	ppbv	1.9	0.2	2.2	0.4	0.2 U	1.9	2.1	2.1	1.8	2.4
TETRACHLOROETHYLENE(PCE)	ppbv	5.9	5.2	5.3	0.2 U	0.2 U	0.2	0.2 U	1 U	0.26	0.51
TOLUENE	ppbv	26	15	23	5.5	0.38	11	11	11	11	11
TRICHLOROETHYLENE	ppbv	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.24	0.25	1 U	0.21	0.28
VINYL CHLORIDE	ppbv	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U	0.25	0.2 U
XYLENES, TOTAL	ppbv	6.6	0.89	7.1	1.8	0.2 U	5.7	6.3	6.7	5.5	7.1

Qualifier Key: " " - detected; "U" - Not Detected

Appendix D
Triax Building Investigation

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: 519·884·0510 Facsimile: 519·884·0525
www.CRAworld.com

September 8, 2005

Reference No. 19023-84

Mr. Kevin Adler
United States Environmental Protection Agency
Region V, 77 West Jackson Boulevard
Chicago, IL 60604-3590

Dear Mr. Adler:

Re: Waukegan Manufactured Gas and Coke Plant Site
100 Seahorse Drive, TRIAX Building
Waukegan Concerns

We have completed additional PCB characterization sample collection and analysis inside the TRIAX Building as described in our June 20, 2005 letter to you. Twenty-one wipe samples were collected on August 11, 2005. A summary of results is presented on Table 1, attached. Laboratory Reports are presented in Attachment A. Two samples were broken in transit and were not analyzed.

Results

The results indicate that horizontal surfaces, roof truss members, flat roof of internal buildouts and the main floor, have variable concentrations of PCBs ranging up to a high of 19 $\mu g/100\ cm^2$. These results are consistent with the April 6, 2005 wipe sample results obtained by CH_2M Hill.

PCBs were not detected on any vertical surface.

Proposed Action

As PCBs are consistently present above 10 $\mu g/cm^2$ the following cleanup task is proposed. This task will be part of the water treatment plant contract and will be completed immediately prior to beginning construction of the water treatment plant.

1. Hand wash roof truss members.
2. Hand wash roof and interior of interior buildouts along the west and south walls.
3. Wash floor with scrubbing unit that vacuums wash water off the floor.
4. Seal the floor with one coat of epoxy floor sealer.
5. As soon as epoxy floor sealer is dry build permanent wall preventing direct access to balance of OMC Plant 2.

Should you have any questions on the above, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

A. Van Norman

Alan Van Norman

AVN/ja/68
Encl.

c.c.: Erin Rednour
Jewelle Keiser
Steven Matuszak
Dr. Campbell
Jim Langseth
Julie Sullivan
Larry Milner
Gary Deigan
John Moore

ATTACHMENT A

TO LETTER OF SEPTEMBER 8, 2005
LABORATORY RESULTS

TABLE 1

SUMMARY OF INVESTIGATIVE WIPE SAMPLE ANALYTICAL DATA
TRIAX BUILDING
WAUKEGAN MANUFACTURED GAS AND COKE PLANT SITE
WAUKEGAN, ILLINOIS

Sample ID	*Sample Location*	*Sample Date*	*Cleanup Criterium* [1] *(µg/100 cm²)*	*Total PCBs* *(µg/100 cm²)*
WS-081105-PP-001	North Wall - floor/wall interface	08/11/05	10	5.6
WS-081105-PP-002	North Wall at 5 feet	08/11/05	10	ND (4.0)
WS-081105-PP-003	North Wall at 15 feet	08/11/05	10	ND (4.0)
WS-081105-PP-004	North Wall at 30 feet	08/11/05	10	ND (4.0)
WS-081105-PP-005	North Wall - below lower chord of roof truss	08/11/05	10	ND (4.0)
WS-081105-PP-006	North Wall - roof truss	08/11/05	10	Not Analyzed
WS-081105-PP-007	South Wall - floor/wall interface	08/11/05	10	ND (4.0)
WS-081105-PP-008	South Wall at 5 feet	08/11/05	10	ND (4.0)
WS-081105-PP-009	South Wall at 15 feet	08/11/05	10	Not Analyzed
WS-081105-PP-010	South Wall at 30 feet	08/11/05	10	ND (4.0)
WS-081105-PP-011	South Wall - below lower chord of roof truss	08/11/05	10	ND (4.0)
WS-081105-PP-012	South Wall - roof truss	08/11/05	10	**16**
WS-081105-PP-013	Build Out South Wall - roof	08/11/05	10	ND (4.0)
WS-081105-PP-014	Build Out South Wall - roof	08/11/05	10	ND (4.0)
WS-081105-PP-015	Build Out South Wall - interior	08/11/05	10	4.8
WS-081105-PP-016	Build Out West Wall - roof	08/11/05	10	**15**
WS-081105-PP-017	Build Out West Wall - roof	08/11/05	10	**15**
WS-081105-PP-018	Build Out West Wall - interior	08/11/05	10	ND (4.0)
WS-081105-PP-019	Floor - in front of east overhead door	08/11/05	10	ND (4.0)
WS-081105-PP-020	Floor - in front of middle overhead door	08/11/05	10	ND (4.0)
WS-081105-PP-021	Floor - in front of overhead door leading north into plant	08/11/05	10	**19**

Notes:

[1]Based on guidance provided in 40 CFR Part 761, Subpart G - PCB Spill Cleanup Policy - high contact solid surface cleanup requirements.
[2]ND - Not detected at quantitation limit stated in parentheses.

SEVERN TRENT STL

STL North Canton
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ANALYTICAL REPORT

PROJECT NO. 019023-84

WAUKEGAN MGP COKE SITE

Lot #: A5H120256

Dave Hendren

Conestoga-Rovers & Associates
8615 W. Bryn Mawr
Chicago, IL 60631

SEVERN TRENT LABORATORIES, INC.

Amy L. McCormick
Project Manager

August 23, 2005

CASE NARRATIVE

A5H120256

The following report contains the analytical results for nineteen wipe samples submitted to STL North Canton by Conestoga-Rovers & Associates, Inc. from the Waukegan MGP Coke Site, project number 019023-84. The samples were received August 12, 2005, according to documented sample acceptance procedures.

Samples WS-081105-PP-006 and WS-081105-PP-009, listed on chain-of-custody record 13297, were received broken and could not be salvaged.

STL utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameter(s) listed on the analytical methods summary page in accordance with the method(s) indicated. Preliminary results were provided to Dave Hendren on August 23, 2005. A summary of QC data for these analyses is included at the back of the report.

STL North Canton attests to the validity of the laboratory data generated by STL facilities reported herein. All analyses performed by STL facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the applicable methods. STL's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

If you have any questions, please call the Project Manager, Amy L. McCormick, at 330-497-9396.

This report is sequentially paginated. The final page of the report is labeled as "END OF REPORT." The total number of pages in this report is 35.

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The temperature of the cooler upon sample receipt was 1.9°C.

CASE NARRATIVE (continued)

POLYCHLORINATED BIPHENYLS-8082

For sample(s) WS-081105-PP-016 and WS-081105-PP-017 the recovery for one surrogate compound is outside acceptance criteria. Since the method criterion is that one of two surrogate compounds must meet acceptance criteria, no corrective action was required.

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

STL North Canton conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program, which is described in detail in QA Policy, QA-003. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. STL North Canton requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. All control analytes indicated by a bold type in the LCS must meet acceptance criteria. Failure to meet the established recovery guidelines requires the repreparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND (non-detected) for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). If the RPD fails for an LCS/LCSD and yet the recoveries are within acceptance criteria, the batch is still acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except under the following circumstances:

- Common organic contaminants may be present at concentrations up to 5 times the reporting limits. Common metals contaminants may be present at concentrations up to 2 times the reporting limit, or the reported blank concentration must be twenty fold less than the concentration reported in the associated environmental samples. (See common laboratory contaminants listed below.)

Volatile (GC or GC/MS)	Semivolatile (GC/MS)	Metals
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

- *for analyses run on TJA Trace ICP, ICPMS or GFAA only*

QUALITY CONTROL ELEMENTS OF SW-846 METHODS
(Continued)

- Organic blanks will be accepted if compounds detected in the blank are present in the associated samples at levels 10 times the blank level. Inorganic blanks will be accepted if elements detected in the blank are present in the associated samples at 20 times the blank level.

- Blanks will be accepted if the compounds/elements detected are not present in any of the associated environmental samples.

Failure to meet these Method Blank criteria requires the repreparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. Due to the potential variability of the matrix of each sample, the MS/MSD results may not have an immediate bearing on any samples except the one spiked; therefore, the associated batch MS/MSD may not reflect the same compounds as the samples contained in the analytical report. When these MS/MSD results fail to meet acceptance criteria, the data is evaluated. If the LCS is within acceptance criteria, the batch is considered acceptable. The acceptance criteria do not apply to samples that are diluted for organics if the native sample amount is 4x the concentration of the spike.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch. However, a Sample Duplicate is less likely to provide usable precision statistics depending on the likelihood of finding concentrations below the standard reporting limit. When the Sample Duplicate result fails to meet acceptance criteria, the data is evaluated.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample is spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

If surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank, and the associated sample(s) are ND, the batch is acceptable. Otherwise, if the LCS, LCSD, or Method Blank surrogate(s) fail to meet recovery criteria, the entire sample batch is reprepped and reanalyzed. If the surrogate recoveries are outside criteria for environmental samples, the samples will be reprepped and reanalyzed unless there is objective evidence of matrix interference or if the sample dilution is greater than the threshold outlined in the associated method SOP.

For the GC/MS BNA methods, the surrogate criterion is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide, PCB, and PAH methods, the surrogate criterion is that one of two surrogate compounds must meet acceptance criteria.

STL North Canton Certifications and Approvals:

California (#01144CA), Connecticut (#PH-0590), Florida (#E87225), Illinois (#200004), Kansas (#E10336), Massachusetts (#M-OH048), Maryland (#272), Minnesota (#39-999-348), New Jersey (#OH001), New York (#10975), North Carolina (#39702), Ohio (#6090), OhioVAP (#CL0024), Rhode Island (#237), South Carolina (#92007001, #92007002, #92007003), Tennessee (#02903), Utah (#QUAN9), Virginia (#00011), West Virginia (#210), Wisconsin (#999518190),NAVY, ARMY, USDA Soil Permit, ACIL Seal of Excellence – Participating Lab Status Award (#82)

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EXECUTIVE SUMMARY - Detection Highlights

A5H120256

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
WS-081105-PP-001 08/11/05 09:00 001				
Aroclor 1254	5.6	4.0	ug	SW846 8082
WS-081105-PP-012 08/11/05 09:50 010				
Aroclor 1254	16	4.0	ug	SW846 8082
WS-081105-PP-015 08/11/05 10:15 013				
Aroclor 1254	4.8	4.0	ug	SW846 8082
WS-081105-PP-016 08/11/05 10:21 014				
Aroclor 1254	15	4.0	ug	SW846 8082
WS-081105-PP-017 08/11/05 10:24 015				
Aroclor 1254	15	4.0	ug	SW846 8082
WS-081105-PP-021 08/11/05 10:49 019				
Aroclor 1254	19	4.0	ug	SW846 8082

ANALYTICAL METHODS SUMMARY

A5H120256

PARAMETER	ANALYTICAL METHOD
PCBs by SW-846 8082	SW846 8082

References:

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A5H120256

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
HHFWC	001	WS-081105-PP-001	08/11/05	09:00
HHFWG	002	WS-081105-PP-002	08/11/05	09:03
HHFWJ	003	WS-081105-PP-003	08/11/05	09:09
HHFWK	004	WS-081105-PP-004	08/11/05	09:13
HHFWL	005	WS-081105-PP-005	08/11/05	09:20
HHFWM	006	WS-081105-PP-007	08/11/05	09:32
HHFWN	007	WS-081105-PP-008	08/11/05	09:35
HHFWQ	008	WS-081105-PP-010	08/11/05	09:43
HHFXF	009	WS-081105-PP-011	08/11/05	09:46
HHFXG	010	WS-081105-PP-012	08/11/05	09:50
HHFXJ	011	WS-081105-PP-013	08/11/05	10:08
HHFXK	012	WS-081105-PP-014	08/11/05	10:11
HHFXM	013	WS-081105-PP-015	08/11/05	10:15
HHFXN	014	WS-081105-PP-016	08/11/05	10:21
HHFXR	015	WS-081105-PP-017	08/11/05	10:24
HHFXT	016	WS-081105-PP-018	08/11/05	10:26
HHFXW	017	WS-081105-PP-019	08/11/05	10:45
HHFX0	018	WS-081105-PP-020	08/11/05	10:47
HHFX2	019	WS-081105-PP-021	08/11/05	10:49

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-001

GC Semivolatiles

Lot-Sample #...: A5H120256-001 Work Order #...: HHFWC1AA Matrix.........: SW
Date Sampled...: 08/11/05 09:00 Date Received..: 08/12/05
Prep Date......: 08/14/05 Analysis Date..: 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 Method.........: SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**5.6**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	88	(52 - 171)
Decachlorobiphenyl	92	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-002

GC Semivolatiles

Lot-Sample #...: A5H120256-002 **Work Order #...:** HHFWG1AA **Matrix.........:** SW
Date Sampled...: 08/11/05 09:03 **Date Received..:** 08/12/05
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 **Method.........:** SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	87	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-003

GC Semivolatiles

Lot-Sample #...:	A5H120256-003	**Work Order #...:**	HHFWJ1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 09:09	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	90	(52 - 171)
Decachlorobiphenyl	93	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-004

GC Semivolatiles

Lot-Sample #...:	A5H120256-004	**Work Order #...:**	HHFWK1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 09:13	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	84	(52 - 171)
Decachlorobiphenyl	89	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-005

GC Semivolatiles

Lot-Sample #...:	A5H120256-005	**Work Order #...:**	HHFWL1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 09:20	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	93	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-007

GC Semivolatiles

Lot-Sample #...: A5H120256-006 **Work Order #...:** HHFWM1AA **Matrix.........:** SW
Date Sampled...: 08/11/05 09:32 **Date Received..:** 08/12/05
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 **Method.........:** SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	93	(52 - 171)
Decachlorobiphenyl	96	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-008

GC Semivolatiles

Lot-Sample #...: A5H120256-007 Work Order #...: HHFWN1AA Matrix.........: SW
Date Sampled...: 08/11/05 09:35 Date Received..: 08/12/05
Prep Date......: 08/14/05 Analysis Date..: 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 Method.........: SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	88	(52 - 171)
Decachlorobiphenyl	96	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-010

GC Semivolatiles

Lot-Sample #...:	A5H120256-008	**Work Order #...:**	HHFWQ1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 09:43	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	84	(52 - 171)
Decachlorobiphenyl	88	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-011

GC Semivolatiles

Lot-Sample #...: A5H120256-009	Work Order #...: HHFXF1AA		Matrix.........: SW
Date Sampled...: 08/11/05 09:46	Date Received..: 08/12/05		
Prep Date......: 08/14/05	Analysis Date..: 08/16/05		
Prep Batch #...: 5226038			
Dilution Factor: 1	Method.........: SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	88	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-012

GC Semivolatiles

Lot-Sample #...: A5H120256-010 **Work Order #...:** HHFXG1AA **Matrix.........:** SW
Date Sampled...: 08/11/05 09:50 **Date Received..:** 08/12/05
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 **Method.........:** SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**16**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	84	(52 - 171)
Decachlorobiphenyl	83	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-013

GC Semivolatiles

Lot-Sample #...: A5H120256-011 **Work Order #...:** HHFXJ1AA **Matrix.........:** SW
Date Sampled...: 08/11/05 10:08 **Date Received..:** 08/12/05
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 **Method.........:** SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	88	(52 - 171)
Decachlorobiphenyl	101	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-014

GC Semivolatiles

Lot-Sample #...:	A5H120256-012	**Work Order #...:**	HHFXK1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 10:11	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	89	(52 - 171)
Decachlorobiphenyl	91	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-015

GC Semivolatiles

Lot-Sample #...: A5H120256-013 **Work Order #...:** HHFXM1AA **Matrix.........:** SW
Date Sampled...: 08/11/05 10:15 **Date Received..:** 08/12/05
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1 **Method.........:** SW846 8082

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**4.8**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	90	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-016

GC Semivolatiles

Lot-Sample #...:	A5H120256-014	**Work Order #...:**	HHFXN1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 10:21	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**15**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	246 *	(39 - 187)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-017

GC Semivolatiles

Lot-Sample #...:	A5H120256-015	**Work Order #...:**	HHFXR1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 10:24	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**15**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	228 *	(39 - 187)

NOTE(S):

* Surrogate recovery is outside stated control limits.

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-018

GC Semivolatiles

Lot-Sample #...: A5H120256-016	**Work Order #...:** HHFXT1AA		**Matrix.........:** SW
Date Sampled...: 08/11/05 10:26	**Date Received..:** 08/12/05		
Prep Date......: 08/14/05	**Analysis Date..:** 08/16/05		
Prep Batch #...: 5226038			
Dilution Factor: 1	**Method.........:** SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	107	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-019

GC Semivolatiles

Lot-Sample #...:	A5H120256-017	**Work Order #...:**	HHFXW1AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 10:45	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	89	(52 - 171)
Decachlorobiphenyl	98	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-020

GC Semivolatiles

Lot-Sample #...:	A5H120256-018	**Work Order #...:**	HHFX01AA	**Matrix.........:**	SW
Date Sampled...:	08/11/05 10:47	**Date Received..:**	08/12/05		
Prep Date......:	08/14/05	**Analysis Date..:**	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	**Method.........:**	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	ND	4.0	ug
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	83	(52 - 171)
Decachlorobiphenyl	88	(39 - 187)

Conestoga-Rovers & Associates, Inc.

Client Sample ID: WS-081105-PP-021

GC Semivolatiles

Lot-Sample #...:	A5H120256-019	Work Order #...:	HHFX21AA	Matrix.........:	SW
Date Sampled...:	08/11/05 10:49	Date Received..:	08/12/05		
Prep Date......:	08/14/05	Analysis Date..:	08/16/05		
Prep Batch #...:	5226038				
Dilution Factor:	1	Method.........:	SW846 8082		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Aroclor 1016	ND	4.0	ug
Aroclor 1221	ND	4.0	ug
Aroclor 1232	ND	4.0	ug
Aroclor 1242	ND	4.0	ug
Aroclor 1248	ND	4.0	ug
Aroclor 1254	**19**	**4.0**	**ug**
Aroclor 1260	ND	4.0	ug

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	86	(52 - 171)
Decachlorobiphenyl	118	(39 - 187)

QUALITY CONTROL SECTION

METHOD BLANK REPORT

GC Semivolatiles

Client Lot #...: A5H120256 **Work Order #...:** HHH051AA **Matrix.........:** WIPE
MB Lot-Sample #: A5H140000-038
Prep Date......: 08/14/05
Analysis Date..: 08/16/05 **Prep Batch #...:** 5226038
Dilution Factor: 1

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD
Aroclor 1016	ND	4.0	ug	SW846 8082
Aroclor 1221	ND	4.0	ug	SW846 8082
Aroclor 1232	ND	4.0	ug	SW846 8082
Aroclor 1242	ND	4.0	ug	SW846 8082
Aroclor 1248	ND	4.0	ug	SW846 8082
Aroclor 1254	ND	4.0	ug	SW846 8082
Aroclor 1260	ND	4.0	ug	SW846 8082

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	103	(52 - 171)
Decachlorobiphenyl	119	(39 - 187)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Semivolatiles

Client Lot #...: A5H120256 **Work Order #...:** HHH051AC-LCS **Matrix.........:** WIPE
LCS Lot-Sample#: A5H140000-038 HHH051AD-LCSD
Prep Date......: 08/14/05 **Analysis Date..:** 08/16/05
Prep Batch #...: 5226038
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD
Aroclor 1016	**105**	**(79 - 141)**			**SW846 8082**
	111	**(79 - 141)**	**5.6**	**(0-30)**	**SW846 8082**
Aroclor 1260	**107**	**(71 - 136)**			**SW846 8082**
	108	**(71 - 136)**	**1.4**	**(0-30)**	**SW846 8082**

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
Tetrachloro-m-xylene	100	(52 - 171)
	103	(52 - 171)
Decachlorobiphenyl	110	(39 - 187)
	114	(39 - 187)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773)380-9933 phone
(773)380-6421 fax

CHAIN-OF-CUSTODY RECORD

SHIPPED TO (Laboratory Name): STL

REFERENCE NUMBER: 19023-84

PROJECT NAME: Waukegan MGP Coke Site

SAMPLER'S SIGNATURE: [signature] **PRINTED NAME:** Pritesh Pathak

SEQ. No.	DATE	TIME	SAMPLE IDENTIFICATION No.	SAMPLE MATRIX	No. OF CONTAINERS	Total PCBs	REMARKS
	8/11/05	9:00	WS-081105-PP-001	WIPE	1	X	
	8/11/05	9:03	WS-081105-PP-002	↓	1	X	
	8/11/05	9:09	WS-081105-PP-003		1	X	
	8/11/05	9:13	WS-081105-PP-004		1	X	
	8/11/05	9:20	WS-081105-PP-005		1	X	
	8/11/05	9:23	WS-081105-PP-006		1	X	
	8/11/05	9:32	WS-081105-PP-007		1	X	
	8/11/05	9:33	WS-081105-PP-008		1	X	STAT
	8/11/05	9:40	WS-081105-PP-009		1	X	
	8/11/05	9:43	WS-081105-PP-010		1	X	
	8/11/05	9:46	WS-081105-PP-011		1	X	
	8/11/05	9:50	WS-081105-PP-012		1	X	
	8/11/05	10:08	WS-081105-PP-013		1	X	
	8/11/05	10:11	WS-081105-PP-014		1	X	
	8/11/05	10:15	WS-081105-PP-015	↓	1	X	
			TOTAL NUMBER OF CONTAINERS		15		

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	DATE / TIME
① [signature]	DATE: 8-11-05 TIME: 12:00	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FEDEX **AIR BILL No.** 8513 8380 9669

White -Fully Executed Copy Yellow -Receiving Laboratory Copy Pink -Shipper Copy Goldenrod -Sampler Copy	**SAMPLE TEAM:** P. PATHAK	**RECEIVED FOR LABORATORY BY:** [signature] Annie Sanders DATE: 8/12/05 TIME: 945

13297

1001-00(SOURCE)GN-CO004

STL North Canton

CONESTOGA-ROVERS & ASSOCIATES
8615 W. Bryn Mawr Avenue
Chicago, Illinois 60631
(773)380-9933 phone
(773)380-6421 fax

CHAIN-OF-CUSTODY RECORD

SHIPPED TO (Laboratory Name): STL North Canton

REFERENCE NUMBER: 19023-84

PROJECT NAME: Waukegan MGP Coke Site

SAMPLER'S SIGNATURE: [signature] **PRINTED NAME:** Pritesh Pathak

SEQ. No.	DATE	TIME	SAMPLE IDENTIFICATION No.	SAMPLE MATRIX	No. OF CONTAINERS	PARAMETERS: Total PCBs	REMARKS
	8/11/05	1021	WS-081105-PP-016	WIPE	1	X	
	8/11/05	1024	WS-081105-PP-017	↓	1	X	
	8/11/05	1026	WS-081105-PP-018		1	X	
	8/11/05	1045	WS-081105-PP-019		1	X	
	8/11/05	1047	WS-081105-PP-020		1	X	
	8/11/05	1049	WS-081105-PP-021		1	X	
							STAT
			TOTAL NUMBER OF CONTAINERS		6		

RELINQUISHED BY	DATE / TIME	RECEIVED BY	DATE / TIME
① [signature]	DATE: 8/11/05 TIME: 12:00	②	DATE: TIME:
②	DATE: TIME:	③	DATE: TIME:
③	DATE: TIME:	④	DATE: TIME:

METHOD OF SHIPMENT: FEDEX **AIR BILL No.** 8513 8380 9669

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: P. PATHAK

RECEIVED FOR LABORATORY BY: [signature] 13304
DATE: 8/12/05 TIME: 945

1001-00(SOURCE)GN-CO004

STL Cooler Receipt Form/Narrative **Lot Number:** A5H120256

North Canton Facility

Client: CRA Project: Waukegan Coke Quote#:

Cooler Received on: 8/12/05 Opened on: 8/12/05 by: (Signature)

Fedx [x] Client Drop Off [ ] UPS [ ] DHL [ ] FAS [ ] Other:

STL Cooler No#______ Foam Box [ ] Client Cooler [ ] Other NO #

1. Were custody seals on the outside of the cooler? Yes [ ] No [x] Intact? Yes [ ] No [ ] NA [x]
   If YES, Quantity______
   Were the custody seals signed and dated? Yes [ ] No [ ] NA [x]
2. Shipper's packing slip attached to this form? Yes [x] No [ ] NA [ ]
3. Did custody papers accompany the samples? Yes [x] No [ ] Relinquished by client? Yes [x] No [ ]
4. Did you sign the custody papers in the appropriate place? Yes [x] No [ ]
5. Packing material used: Bubble Wrap [x] Foam [ ] None [ ] Other:______
6. Cooler temperature upon receipt 1.9 °C (see back of form for multiple coolers/temp)

METHOD: Temp Vial [ ] Coolant & Sample [ ] Against Bottles [ ] IR [x] ICE/H_20 Slurry [ ]

COOLANT: Wet Ice [x] Blue Ice [ ] Dry Ice [ ] Water [ ] None [ ]

7. Did all bottles arrive in good condition (Unbroken)? Yes [ ] No [x]
8. Could all bottle labels and/or tags be reconciled with the COC? Yes [x] No [ ]
9. Were samples at the correct pH? (record below/on back) Yes [ ] No [ ] NA [x]
10. Were correct bottles used for the tests indicated? Yes [x] No [ ]
11. Were air bubbles >6 mm in any VOA vials? Yes [ ] No [ ] NA [x]
12. Sufficient quantity received to perform indicated analyses? Yes [x] No [ ]

Contacted PM ALM Date: 8/12/05 by: Ams via Voice Mail [x] Verbal [ ] Other [ ]

Concerning: Breakage

√		

1. CHAIN OF CUSTODY

The following discrepancies occurred:

$\varnothing$

2. SAMPLE CONDITION

Sample(s)______ were received after the recommended holding time had expired.

Sample(s) 006 + 009 - 18250 were received in a broken container. - VOA Romaine

013 - Lid cracked - Replaced in ROC.

3. SAMPLE PRESERVATION

Sample(s)______ were further preserved in sample receiving to meet recommended pH level(s). *Nitric Acid Lot # 051105-HNO3; Sulfuric Acid Lot # 102804-H2SO4; Sodium Hydroxide Lot # -041305 -NaOH; Hydrochloric Acid Lot # 100504-HCl; Sodium Hydroxide and Zinc Acetate Lot # 071604-CH3COO2ZN/NaOH*

Sample(s)______ were received with bubble > 6 mm in diameter (cc: PM)

4. Other (see below or back)

Client ID	pH	Date	Initials

STL Cooler Receipt Form/Narrative
North Canton Facility

Client ID	pH	Date	Initials

Cooler	Temp	Method	Coolant

Discrepancies Cont.

END OF REPORT

Appendix E
Human Health Risk Assessment

APPENDIX E

Human Health Risk Assessment

Introduction

This appendix presents the detailed assumptions and calculations supporting the human health risk assessment (HHRA; summarized in Section 5 of the Remedial Investigation [RI] Report). This risk assessment has been prepared utilizing conservative assumptions, and feasible exposure pathways that are based on current site conditions and current and potential future site usage. This HHRA was prepared in accordance with United States Environmental Protection Agency (USEPA) risk assessment methodology and guidance including the following:

- *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, Part A* (USEPA 1989)
- *User's Guide for the Johnson and Ettinger Model (1991) Model for Subsurface Vapor Intrusion into Buildings* (USEPA 2004a)
- *Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites* (USEPA 2002)
- *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment (Interim)* (USEPA 2004b)

The steps involved in preparing this HHRA are described below:

- **Development of a Conceptual Model of Exposure Pathways**–This conceptual model depicts the potential sources of contaminants, receptor populations, and potentially complete pathways linking sources and receptors.
- **Exposure Assessment**–The exposure assessment is conducted to estimate the magnitude, frequency, and duration of potential human exposures for the most feasible current and future site uses.
- **Toxicity Assessment**–The toxicity assessment involves characterizing the toxicological properties and health effects associated with exposure to contaminants of potential concern (COPCs) and summarizes the relationship between magnitude of exposure and occurrence of adverse health effects.
- **Risk Characterization**–The risk characterization summarizes and integrates the results of the exposure and toxicity assessments to characterize potential health risks, both numerical expressions and qualitative statements.
- **Uncertainty Assessment**–The assessment identifies sources of uncertainty associated with the data, methodology, and the values used in the risk assessment. The uncertainty

assessment provides a context for interpreting the quantitative risk characterization results.

Conceptual Model of Exposure Pathways

A conceptual model of potential exposure pathways has been developed for the Outboard Marine Corporation (OMC) Plant 2 (the site) to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes a specific environmental pathway by which a receptor can be exposed to the chemicals in environmental media.

The conceptual model presented below incorporates the site setting and distribution of chemical results presented in this RI Report. It also incorporates anticipated future site conditions described in the City of Waukegan Lakefront Master Plan.

Exposure Setting

The physical setting for the site is described in Section 2 of the RI Report. The current land use in the vicinity of OMC Plant 2 is primarily marine-recreational and industrial, but also includes utilities and a public beach east of the site. The nearest residences are about 0.3 mile west of the site on top of a bluff. The City of Waukegan's Lakefront Master Plan indicates that the future development of the property will likely include demolition of the plant, development of the property, and restoration of the beachfront area for public access. The plan defines the northern portion of the OMC Plant 2 property as an "Eco-Park" development that transitions to mixed-use marina-related commercial and residential use on the southern portion of the property

Identification of Potentially Exposed Populations

Current

The OMC Plant 2 site consists of about 65 acres, upon which are situated a 1,036,000-square foot former manufacturing plant building and several parking lot areas to the north and south of the building complex. The property has been unoccupied since it was abandoned by OMC in 2002. The buildings are locked and access to the property is restricted by fences and locked gates. Under current conditions, there are unlikely to be potential exposure pathways with the exception of trespassers entering the existing OMC building.

The site, surrounding properties, and the City of Waukegan obtain potable water from Lake Michigan. The City of Waukegan has no municipal potable wells. There are reportedly some private residential wells within the city limits at a distance from the site (URS 2000). The exact locations of these private residential wells are not known. However, based on the location of the site relative to the lake and residential areas and the regional and site-specific hydrogeological data, there are no existing residential wells that could be impacted by this site. Therefore, current residential land use, including potable groundwater use, was not further evaluated in this HHRA.

Future

For purposes of this HHRA, the potentially exposed populations would be located within the existing structure or future structures and in open access areas. For the future exposure scenarios, the following populations were selected:

- Residents
- Recreational users
- Construction workers

Identification of Potentially Complete Exposure Pathways

The potential exposure pathways under current conditions may involve trespassers entering the OMC Plant 2 building. These individuals could potentially become exposed to polychlorinated biphenyls (PCBs) through dermal contact with contaminated surfaces.

Potentially complete exposure pathways under future land uses that were addressed in this HHRA are shown in Figure E-1 in the RI Report. These are briefly described for each of the potentially exposed populations:

- Residents: As described in the City's plans, the anticipated future land use includes residential and commercial land uses. As part of this development, the majority of the site soils would likely be covered by buildings, pavement, landscaping, and clean fill soils. Therefore, it is assumed that there may be limited direct contact with chemicals in the surface soils and no direct contact pathway with groundwater. There could be potential inhalation exposure pathways to volatile organic compounds (VOCs) from indoor vapor intrusion and releases of VOCs from groundwater through soil column to outdoor air. Although the use of local groundwater as a potable water source is improbable based on the presence of a municipal water supply and future institutional controls (e.g., deed restrictions and well permitting requirements), it is the USEPA's policy that all groundwater be protected for beneficial use as a potential drinking source. Therefore, site groundwater was evaluated for its potential impacts to human health under a residential scenario.

- Recreational Users: Recreational users could potentially be exposed to chemicals in surface soils, through soil ingestion and dermal contact. It is assumed that recreational users could come into contact with surface soils in the proposed park to be constructed across the northern portion of the property and the beachfront area east of the site.

- Construction Workers: Construction workers could potentially be exposed to chemicals in surface and subsurface soils and in groundwater. Construction workers could potentially be exposed through soil ingestion, dermal contact with soil or groundwater, inhalation of volatiles from soil or groundwater, and inhalation of particulates suspended into the air from soil.

Exposure Assessment

Exposure assessment is the estimation of the magnitude, frequency, duration, and routes of exposure to a chemical. Human exposure to chemicals is typically evaluated by estimating the amount of a chemical that could come into contact with the lungs, gastrointestinal tract, or skin during a specified period of time. This exposure assessment is based on scenarios that define human populations potentially exposed to the COPCs that may originate from soil, groundwater, or air at the site. The potential pathways of exposure, frequency and duration of potential exposures, rates of contact with environmental media, and concentrations of chemicals in those media were considered in the exposure assessment. Chemical intakes and associated risks were quantified for all exposure pathways considered potentially complete. This section describes the assumptions, data, and methods used to evaluate the potential for human exposure to COPCs located at the site. The process involves the following steps:

- Identifying potentially exposed populations
- Identifying potential exposure pathways and selection of complete exposure pathways
- Evaluating the environmental fate and transport of chemicals in soil
- Estimating exposure point concentrations used to quantify chemical intakes
- Quantifying chemical intakes for each exposure pathway

The information developed through the conceptual site model was used to develop exposure scenarios in this HHRA. An exposure scenario describes the sources of the chemical substances that could come into contact with the subject population, the exposure pathways through which contact could occur, and the characteristics of that population that affect the resulting levels of exposure. The exposure scenario presented is the **reasonable maximum exposure (RME).** The RME is the highest exposure that is reasonably expected to occur at a site. The intent of the RME is to develop a conservative estimate of exposure (i.e., well above the average case) that is still within the range of plausible exposures (USEPA 1989). Acute (short term) health effects are generally considered when the chemicals of concern have the potential to produce an effect over a very short period of time, the concentrations are very high or the nature and duration of the exposure is limited to a very short duration. Since these conditions do not exist at OMC Plant 2, risk characterization was limited to chronic health effects.

Identification of Potentially Exposed Populations

As described in the conceptual model of potential exposure pathways, the potentially exposed populations evaluated under current land use are trespassers and under the future land use include residents, recreational users, and construction workers.

Identification of Potential Exposure Pathways

Figure 5-1 identifies potentially complete exposure pathways. The potential exposure pathways that were evaluated in this assessment are: potential direct contact with chemicals in groundwater and soil: inhalation of chemicals in outdoor air and indoor air from vapor intrusion from soil and groundwater; ingestion, dermal contact and inhalation from indoor use of groundwater; and dermal contact with PCBs on building surfaces.

Evaluation of Environmental Fate and Transport

Environmental fate and transport analysis was performed to address dermal contact with chemicals in surface soil (all future land use scenarios) and subsurface soil (construction worker exposure scenario), vapor intrusion from groundwater into outdoor air (all future land use scenarios)and indoor air (for the residential exposure scenario), residential groundwater use, dermal contact with chemicals in groundwater (construction worker exposure scenario), and dermal contact with PCBs on building surfaces (trespasser scenario).

Outdoor Air Concentrations from Soil

The calculations of potential exposures incorporate volatilization factors (VFs) for volatile contaminants and particulate emission factors (PEFs) for nonvolatile contaminants in order to calculate concentrations in air associated with emissions from the soil. These factors relate soil contaminant concentrations to air contaminant concentrations that may be inhaled onsite. The VFs and PEFs were based on the default values presented in the USEPA Region 9 Preliminary Remediation Goals (PRG) document (USEPA 2005b).

Indoor Vapor Intrusion

Estimates of VOC concentrations in indoor air from VOC concentrations in groundwater were evaluated using the Johnson and Ettinger (1991) screening-level model (USEPA 2004a). This model incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from either subsurface soils or groundwater into indoor spaces located directly above or near the source of contamination.

Parameters required for implementing the model include soil properties (such as porosity, moisture content, and heterogeneity), building properties (dimensions, air exchange rate, soil-building pressure difference, surface area available for soil gas intrusion), and chemical properties (VOC concentrations in groundwater, depth to groundwater). The parameter values, data sources, and assumptions used in their development are documented in Table E-1. The Johnson and Ettinger model calculations are documented in Appendix E, Attachment 1.

Volatilization from Water

A model presented in the USEPA *Air Emissions Models for Waste and Wastewater* document (USEPA 1994) was used to estimate emissions of VOCs released through volatilization into indoor air from water in an uncovered sump. The model used to estimate emissions from the liquid surface was based on an overall mass transfer coefficient that incorporates two resistances to mass transfer in series, the liquid-phase resistance, and the gas-phase resistance (USEPA 1994).

Dermal Contact with PCBs on Surfaces

The methods and assumptions for calculating intakes and remediation levels for PCBs on surfaces was based on USEPA's methodology presented in the PCB Spill Cleanup Policy (40 Code of Federal Regulations [CFR] 761.125) (EPA 1986). The approach was based on estimating the skin surface that comes into contact with a contaminated surface, and the assumption that contact occurs frequently enough that there is continually a residue of PCBs on the skin. The palm and fingers were assumed to come into contact with a PCB-contaminated surface once per day. The skin surface of the hands is 840 square centimeters (cm^2); one-half of this skin surface (the palm and bottom surfaces of the fingers), or 420 cm^2 was assumed to come into contact with the contaminated surface. One-half of the PCBs on the surface are assumed to be transferred to the skin. With these assumptions, an individual was assumed to continually absorb PCBs through the skin of the hands from contact with contaminated surfaces. A dermal absorption factor of 14 percent (USEPA 2004b) was used to calculate intake through this pathway.

Residential Groundwater Use

The potential health effects from general groundwater use were estimated based on the health risks from ingestion of groundwater, inhalation of volatile compounds released from groundwater, and dermal absorption of chemicals in groundwater, were evaluated (USEPA 1991, 2005b).

Estimation of Exposure Point Concentrations

The exposure point concentrations are the concentrations in the environmental media (e.g., soil, groundwater, or on the building material surfaces) that are used to estimate the potential intake of chemicals in humans. As described previously, measured concentrations in soil or groundwater were used to model the concentrations in air that humans could inhale.

Selection of Analytical Data

Analytical data used to calculate exposure point concentrations include analytical results from surface soil, subsurface soil, wipe samples, and groundwater samples. Table E-2 summarizes the samples included in the risk evaluation.

Analytical data for samples collected during the RI were validated, and results of the validation were incorporated as data qualifiers. The data usability evaluation is presented in Appendix C of the RI report. The following rules were used following data validation to identify data to be used in the risk evaluation:

- Estimated values flagged with a "J" were treated as detected concentrations.
- Constituents that were not detected in at least 5 percent of samples were excluded from the quantitative risk evaluation, with the exception of those constituents that are considered by USEPA to be potential human carcinogens.
- One-half of the sample detection limit (DL) was used in the risk assessment for cases where no detectable contaminant quantities were found in a sample, but the contaminant was detected in other samples from the same medium.

Selection of Exposure Units

Exposure units represent portions of the site where receptors (such as residents or recreational site users) could come into contact with COPCs. The exposure units were used to identify how samples should be grouped to calculate exposure point concentrations. The following exposure units were defined for this risk assessment:

- Residents: The exposure unit for future residential use was based on the footprint of the proposed urban area in the City's master plan.
- Construction Workers: The exposure unit for construction workers was based on the footprint in the proposed urban area in the City's master plan plus the park area across the northern portion of the site.

- Recreational Users: The exposure unit for future recreational users of the site was the proposed park across the northern portion of the site and the beach front area east of the site.

Calculation of Exposure Point Concentrations

The exposure point concentration (EPC) is the reasonable upper-bound estimate of the mean concentration that is contacted over the exposure period. USEPA recommends that the EPC be near the 95 percent upper confidence limit (UCL 95), which is a value that, when calculated repeatedly for randomly drawn subsets of the site data, equals or exceeds the true mean 95 percent of the time (USEPA 1992).

The EPCs were calculated using site data and the latest version of USEPA's ProUCL tool (USEPA 2004c). The estimated EPC values were the UCLs at 95 percent or higher (UCL 97.5 and UCL 99) above the mean. The summary statistics and ProUCL model outputs are documented in Appendix E, Attachment 2.

Quantification of Exposures

Constituent intake is the amount of the constituent contaminant entering the receptor's body. Constituent intakes are generally expressed as follows:

$$I = \frac{C \ x \ CR \ x \ EF \ x \ ED}{BW \ x \ AT} = (mg/kg/day)$$

Where:

I = intake (mg/kg-day)

C = constituent concentration at exposure point (mg/L, mg/kg, mg/m^3)

CR= contact rate, or amount of contaminated medium contacted per unit time or event (L/day, mg/event, m^3/day)

EF= exposure frequency (days/year)

ED= exposure duration (years)

BW= body weight of exposed individual (kg)

AT= averaging time, or period over which exposure is averaged (days)

The intake equation requires specific exposure parameters for each exposure pathway. The exposure factors used for each exposure scenario at the site are shown in Table E-3.

A dermal absorption factor is required for the dermal exposure to soil pathway. Dermal absorption factors were obtained from USEPA's *Risk Assessment Guidance for Superfund, Part E* (USEPA July 2004b). The methods presented in USEPA's *Risk Assessment Guidance for Superfund, Part E* (USEPA July 2004b) for estimating dermal exposure to water were used to evaluate dermal exposure to groundwater for construction workers in direct contact with groundwater in an open excavation.

Toxicity Assessment

The toxicity assessment describes the relationship between magnitude of exposure to a constituent and adverse health effects. It provides, where possible, a numerical estimate of the increased likelihood and severity of adverse effects associated with constituent exposure (USEPA 1989). This subsection briefly describes the adverse effects and toxicity values used to calculate potential risks for constituents detected at the facility.

Health effects were divided into two broad categories: noncarcinogens and carcinogens. This division was based on the different mechanisms of action currently associated with each category. Constituents causing noncarcinogenic health effects were evaluated independently from those having carcinogenic effects. Some constituents may produce both noncarcinogenic and carcinogenic effects, and were therefore evaluated in both groups. The toxicity values were then combined with the exposure estimates (as presented in the previous section) to develop the numerical estimates of potential carcinogenic risk and potential noncarcinogenic health risks. These numerical estimates were then used in the risk characterization process to estimate adverse effects from constituents in soils and groundwater.

The primary source of toxicity values used in this assessment was the Integrated Risk Information System (IRIS; USEPA 2005a), a database available through the National Center for Environmental Assessment (NCEA). In accordance with USEPA guidance (USEPA 1989), the second tier of toxicity factors is the Provisional Peer Reviewed Toxicity Value (PPRTV) database maintained by USEPA's NCEA. If toxicity data are not available from either of these sources, USEPA will consider toxicity values obtained from other USEPA and peer-reviewed non-USEPA sources, such as provisional NCEA toxicity values and USEPA's Health Effects Assessment Summary Tables (HEAST; USEPA 1997).

Toxicity Information for Noncarcinogenic Effects

Noncarcinogenic effects were evaluated using either reference doses (RfDs) or reference concentrations developed by USEPA. The RfD is a health-based criterion, expressed as constituent intake rate in units of milligrams per kilogram per day (mg/kg/day), and is used in evaluating noncarcinogenic effects. The RfD is based on the assumption that thresholds exist for certain toxic effects, such as liver or kidney damage, but may not exist for other toxic effects, such as carcinogenicity. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of adverse effects during a lifetime of exposure (USEPA 1989).

USEPA (1989) defines the chronic RfD as a dose that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure. Chronic RfDs are specifically developed to be protective for long-term exposure to a constituent (e.g., 7 years to a lifetime), and consider uncertainty in the toxicological database and sensitive receptors.

Per USEPA guidance, oral RfDs were adjusted from administered doses to absorbed doses for evaluating dermal toxicity when appropriate (USEPA 2004c). The oral RfDs were adjusted using oral absorption factors from USEPA (USEPA 2004c). The adjusted dermal RfDs are summarized on tables in the Risk Characterization section (see below).

Toxicity Information for Carcinogenic Effects

Potential carcinogenic effects were quantified as oral cancer slope factors, inhalation slope factors, or unit risk factors that convert estimated exposures directly to incremental lifetime cancer risks. Cancer slope factors (CSFs) may be derived from the results of chronic animal bioassays, human epidemiological studies, or both. Animal bioassays are usually conducted at dose levels that are much higher than are likely to be encountered in the environment. This design detects possible adverse effects in the relatively small test populations used in the studies. A number of mathematical models and procedures have been developed to extrapolate from the high doses used in the studies to the low doses typically associated with environmental exposures.

Since risk at low levels of exposure cannot be quantified directly by animal or epidemiological studies, mathematical models were used to extrapolate from high doses to low doses. The USEPA-preferred linearized multistage model is usually used to estimate the largest linear slope (within the UCL 95) at low extrapolated doses that is consistent with the data. Using linearized multistage model leads to a conservative upper-bound estimate of risk. The most sensitive species of animal was used for extrapolation to humans (i.e., man is assumed to be as sensitive as the most sensitive animal species). True risk was not likely to be higher than the estimate and most likely is lower, and could even be zero.

Toxicity values used to characterize health risks are presented on the tables summarizing risk assessment calculations for each scenario (presented below).

Risk Characterization

Risk characterization is the process of integrating the previous elements of the risk assessment into quantitative and semi-quantitative expressions of risk. The calculated risk can be used as an integral component in remedial decision making and selection of potential remedies or actions, if necessary.

Potential human health risks are discussed independently for carcinogenic and noncarcinogenic contaminants because of the different toxicological endpoints, relevant exposure duration, and methods used to characterize risk.

Noncarcinogenic Risk Estimation

Noncarcinogenic health risks were estimated by comparing actual or expected exposure levels to threshold concentrations (or RfDs). The expected intake divided by the RfD is equal to the hazard quotient (HQ):

Hazard Quotient (HQ) = Intake / RfD

The intake and RfD are expressed in the same units and represent the same exposure period (i.e., chronic or subchronic). The intake and RfD also represent the same exposure route (i.e., inhalation intakes are divided by the inhalation RfD). When the HQ exceeds unity (i.e., exposure exceeds the RfD), a certain degree of potential health risk is indicated. To assess the potential for noncarcinogenic health effects posed by exposure to multiple constituents, a “hazard index” approach is used (USEPA 1989). This approach assumes that noncarcinogenic hazards associated with exposure to more than one constituent are additive.

Generally, USEPA identifies a noncancer hazard index (HI) of unity (1.0) as a level where further action is not warranted to reduce potential risks (USEPA 1991). The HI may exceed 1.0 even if all of the individual HQs are less than 1.0. The constituents may then be segregated by similar mechanisms of toxicity and toxicological effects, and separate HIs derived based on mechanism and target organs affected. If the HIs summed by target organ do not exceed 1.0, it is assumed that there would be no adverse noncarcinogenic health effects.

Carcinogenic Risk Estimation

The potential for carcinogenic effects due to exposure to site-related contamination was evaluated by estimating excess lifetime carcinogenic risk. Excess lifetime carcinogenic risk (ELCR) is the incremental increase in the probability of developing cancer during one's lifetime in addition to the background probability of developing cancer.

Potential carcinogenic risks associated with exposure to individual carcinogens were calculated using the CSFs presented in the Toxicity Assessment section and the intakes calculated as presented in the Exposure Assessment section. Risk was calculated by multiplying the intake by the CSF.

$$\text{Risk} = \text{Intake} \times \text{CSF}$$

The combined risk from exposure to multiple constituents at a site was evaluated by adding the risks from individual constituents. Risks were also added across the pathways, if an individual would be exposed through multiple pathways. For example, a person contacting the soil could be exposed by both the oral and dermal pathways.

Generally, USEPA considers action to be warranted at a site when ELCRs exceed 1×10^{-4}, and action may not be required for risks falling within 1×10^{-4} to 1×10^{-6} (USEPA 1991). However, this is judged on a case-by-case basis. Risks less than 1×10^{-6} generally are not of concern to regulatory agencies (USEPA 1991).

Risk Assessment Results

The numerical results (noncarcinogenic and carcinogenic risks) are presented in Tables E-4 through E-14, and are discussed below in the following sections.

Trespassers (Current Land Use)

Potential exposure pathway under current land use conditions was assumed to be associated with a trespasser who might have dermal contact with PCB-contaminated material surfaces in the plant. Risk-based values were calculated, as previously described, to evaluate the potential risks associated with occasional dermal contact with PCBs on surfaces of the building materials. The exposure point concentration combined for porous and nonporous surfaces was 97.7 micrograms (µg)/100 cm^2. This value was compared with the risk-based value of 4.4 µg/100 cm^2, which corresponds to an ELCR of 1×10^{-6}. The risk-based value was based on the assumption of an exposure frequency of 99 days/year, over a 7-year period. Therefore, the increased ELCR of a trespasser under these assumptions would be 2×10^{-5}.

Residents (Future Land Use)

Direct Contact with Soils: As discussed previously, under the proposed future land use, potential direct contact with soils by residents was assumed to be limited. However, the potential direct contact pathway was evaluated under the assumption that future land use could differ from the proposed master plan. The results from this pathway evaluation are presented in Tables E-4 through E-6. Noncancer risks associated with direct contact with soil by an adult (summed across all chemicals regardless of target organ or critical effect) would be a cumulative noncancer HI of 0.2, and the noncancer risks associated with direct contact with soil by a child resident would be a cumulative HI of 0.1, both well below USEPA's target value for risk reduction (a noncancer HI of 1.0). The largest contributions to the cumulative hazard indices were from PCBs in soil for an adult, and polynuclear aromatic hydrocarbons (PAHs) in soil for a child. The ELCR associated with potential direct contact with soils by residents is 4×10^{-4}. Carcinogenic PAHs in soil provide the largest contribution to the total cancer risk.

Outdoor Air: The potential risk from volatile compounds migrating through the soil column and being released to air was evaluated to determine the impacts to residents engaged in outdoor activities. Although soil cover such as parking lots, roads, buildings and sidewalks will reduce the surface area for volatilization, the assumption was made that 100 percent of the source area will be available for volatilization. The noncancer HI from inhalation of fugitive volatiles was estimated to be 4×10^{-5} for adults and 1×10^{-4} for children and the ELCR was 5×10^{-10}; all well below levels of concern.

Indoor Air: The calculation of risks from indoor air inhalation resulting from vapor intrusion from groundwater estimated a HI of 3.0 and the ELCR of 6×10^{-4}. These risks are higher than USEPA's target range for risk reduction. Noncancer risks are driven both by vinyl chloride and trichloroethene (TCE). The estimated cancer risks are driven by vinyl chloride in groundwater. Note that estimated risks from TCE could be up to 65-fold higher, if these risks were characterized using USEPA's proposed cancer slope factor.

Groundwater: Groundwater use is not considered a viable pathway since there are no existing wells in the vicinity of the site and future access to groundwater would likely be restricted by institutional controls. Because it is USEPA's policy that all groundwater be protected for beneficial use as a drinking source, the groundwater pathway was evaluated for its potential impacts to human health under a residential dwelling scenario. The groundwater pathways included were ingestion, inhalation of VOCs released into air, and dermal absorption. The noncancer HI was 141 for a residential adult and 325 for a residential child. Noncancer risk were primarily driven by cis-1,2-dichloroethene, TCE, vinyl chloride, PCBs (Aroclor-1248), total manganese, and total arsenic. ELCR from exposure to groundwater was 2×10^{-2} with the primary contributors being TCE, vinyl chloride, PCBs (Aroclor-1248) and total arsenic.

Construction Workers (Future Land Use)

Potential direct contact with soils by construction workers was associated with a cumulative noncancer HI of 0.5 with PCBs in soil providing the largest contribution to the cumulative noncancer HI. The ELCR associated with potential direct contact with soils by construction workers is 1×10^{-5}, which is within the USEPA's target range for risk reduction. Carcinogenic PAHs in soil provide the largest contribution to the total cancer risk. The noncancer HI and ELCR for construction workers resulting from exposure to volatile compounds released from groundwater is 7 and 6 x 10^{-4}, respectively. These risks are higher than USEPA's target range for risk reduction. The noncancer risks are driven by cis-1,2-dichloroethylene and vinyl chloride and the estimated cancer risk is driven by vinyl chloride.

Recreational Users (Future Land Use)

Potential direct contact with soils by recreational users was associated with cumulative noncancer HIs of 2.6 and 4.9 for adults and adolescents, respectively. PCBs in soil provide nearly the entire contribution the cumulative noncancer HI. The elevated hazard quotient for PCBs was based on an exposure point concentration of 39 milligrams per kilogram (mg/kg) for Aroclor 1254. The exposure point concentrations for the other PCB mixtures in soil were 34 mg/kg (Aroclor 1248) and 40 mg/kg (Aroclor 1260). A noncancer RfD was not available for the other PCB mixtures; however, these PCB mixtures are also associated with adverse noncancer health effects. Therefore, noncancer risks under this scenario likely have been understated. The ELCR associated with potential direct contact with soils by recreational users is 2 x 10^{-4} for adults and 1 x 10^{-4} for adolescents. PCBs and PAHs in soil provide the largest contribution to the total cancer risk. It should be noted that these potential direct contact risks were calculated assuming that the exposure concentrations are equivalent to existing levels in the site soils and represent the worst-case condition. The current concept for the Ecopark consists of a bermed area with clean soil cover over the northern portion of the site. In addition, USEPA has recently conducted a removal action in the beach front area east of the site to remove PCB concentrations greater than 10 mg/kg and replaced with clean soil.

Discussion of Uncertainties

Full characterization of health risks means that the numerical estimates of health risks must be accompanied by a discussion of the uncertainties inherent in the assumptions used in estimating these risks. Uncertainties in the risk estimation process may result in the numerical estimates either understating or overstating health risks associated with chemicals

Potential exposures and health risks associated with chemicals detected in soil, groundwater, and on building surfaces were modeled using site characterization data. The types of receptors evaluated in the risk assessment included an adult and child resident, a construction worker, and a recreational user; these receptors could be present in the future, based on reasonable assumptions regarding potential future site uses. Currently, the site is unoccupied. However, it was assumed that trespassers could enter the OMC Plant 2 building, which is present on the site, and could become exposed to PCBs present on building surfaces.

- Initially, the site characterization data were screened by comparison of the maximum concentrations in soil or groundwater with the USEPA Risk Based Remediation Objectives (Region 9 PRGs or in their absence, Region 3 RBCs) (USEPA 2005b, USEPA 2006). Site chemical concentrations were also compared with the State of Illinois' Tiered Approach to Corrective Action Objectives (TACO) remediation objectives.

- The screening values did not address potential outdoor and indoor air exposures from vapor intrusion from groundwater.
- The screening values did not address a recreational exposure scenario, or trespasser exposure to PCBs in the building.
- Groundwater under the site is not currently used as a drinking water supply.
- Comparison with the USEPA and TACO remediation objective values did not provide an evaluation of cumulative risks (i.e., risks associated with potential exposure to multiple chemicals); cumulative risk estimates were used for comparison with USEPA target risk reduction goals of a 1 x 10^{-4} to 1 x 10^{-6} ELCR, and a noncancer HI of one (USEPA 1991).

The additional scenarios and potential cumulative risk estimates were addressed by conducting an exposure assessment and toxicity assessment, as outlined in USEPA guidelines (USEPA 1989), and as described in this appendix. Uncertainties in the risk estimates were:

- A residential use scenario was evaluated assuming that future residents could have direct contact with chemicals in soil (i.e., soil ingestion, dermal contact, and inhalation of chemicals emitted from soils). These exposure pathways are unlikely to be complete in the future. As described in the City of Waukegan Lakefront Master Plan, development options that would limit potential direct contact exposure pathways.
- The recreational use scenario was based on the assumption that an individual potentially comes into contact with chemicals in soils at the existing concentration levels in the proposed park area (i.e., no additional soil placed in the park construction) for 100 days/year, for a 24-year period. The number of days/year was based on the assumption that an individual is at the park 50 percent of the average number of days during April through October with minimum temperatures higher than 32 degrees Fahrenheit[1]. The exposure frequency and duration assumptions could either overstate or understate an individual's time at the park. Other exposure factors that influence the estimated risks include the soil ingestion rate (480 mg/day) and exposed skin surface area. Selection of these exposure factors was intended to reflect an RME scenario; however, in combination, these upper-bound exposure factors might result in risks being overstated.
- Similarly, the exposure frequency and duration for the trespasser and construction worker scenarios are uncertain, and might either overstate or understate potential risks.
- Potential vapor intrusion risks (residential indoor air risks) were higher than a 1 x 10^{-4} target risk level. The estimated excess lifetime cancer risk was driven by vinyl chloride detected in groundwater. These risk estimates were based on an upper-bound concentration in groundwater. Vapor intrusion likely would not equally affect all structures in the proposed residential area; however, the numbers of structures that might be affected by vapor intrusion in the future is uncertain. Risks from TCE were

[1] Seasonal temperatures measured at climate station 119029 WAUKEGAN 2 WNW, IL. (http://mrcc.sws.uiuc.edu/climate_midwest/historical/grow/il/119029_gsum.html).

assessed using the cancer slope factors withdrawn from IRIS in 1989. Proposed cancer slope factors were developed by USEPA in 2001, and are currently under review by the National Academy of Sciences. The proposed cancer slope factors project risks that are up to 65-fold higher than the withdrawn values. If risks were characterized using the proposed slope factors, TCE risks would be higher than estimated in this risk assessment.

Summary and Conclusions

An exposure assessment and toxicity assessment were conducted as part of the HHRA for the OMC Plant 2 site. This assessment was based on USEPA guidelines and was developed using RME assumptions. This assessment addressed a range of current and future land use scenarios. The conclusions from this assessment were as follows:

- Potential risks to trespassers who might enter the OMC Plant 2 building currently on the site consisted of potential dermal contact with PCBs detected on building surfaces. This exposure scenario was associated with an ELCR of 2×10^{-5}. This estimated risk falls within USEPA's target range for risk reduction of 1×10^{-4} to 1×10^{-6}.
- Potential risks to future residents on the site were as follows:
  - Direct contact with soils was associated with a cumulative noncancer HI of 0.2, well below USEPA's target value for risk reduction (a noncancer HI of 1.0). Noncancer risks from direct contact with soil were driven by PCBs. ELCRs from direct contact with onsite soils were 4×10^{-4}, driven largely by carcinogenic PAHs. This estimated risk is slightly higher than USEPA's target range for risk reduction. This potential exposure pathway is likely to be limited, based on feasible future land uses projected for the site.
  - The cumulative noncancer HI from outdoor inhalation of volatile compounds released from groundwater through soil is well below one and the ECLRs are less than 1×10^{-6}.
  - Noncancer HI from indoor inhalation resulting from vapor intrusion from groundwater vapor intrusion is 3.0 and the ELCR was 6×10^{-4}. These risks are higher than USEPA's target range for risk reduction. Noncancer risks are driven both by vinyl chloride and TCE. The estimated cancer risks are driven by vinyl chloride in groundwater. Note that estimated risks from TCE could be up to 65-fold higher, if these risks were characterized using USEPA's proposed cancer slope factor.
  - Although the future use of local groundwater as a potable water source is improbable due to likely institutional controls (e.g., deed restrictions and well permitting requirements), it is USEPA policy that all groundwater be protected for beneficial use as a potential drinking source. Therefore site groundwater was evaluated for its potential impacts to human health under a residential scenario. If groundwater were used under a residential use scenario, the noncancer HI would be 141 for adults and 325 for children, due primarily from arsenic, TCE and PCBs. The ELCR would be 2×10^{-2} for residential receptors driven by arsenic, vinyl chloride and TCE.

- The cumulative noncancer HIs to recreational users of proposed park across the northern portion of the site and beach front area east of site were 2.6 and 4.9 for recreational adults and adolescents, respectively. ELCR were 2×10^{-4} for adults and 1×10^{-4} x for adolescents. These risks are slightly higher than USEPA's target range for risk reduction. Note that the noncancer hazard index does not include potential noncancer risks for some PCB mixtures, and therefore might be underestimated. The use of existing concentrations as exposure concentrations may overestimate risk as it does not consider that additional soil cover will needed to construct the park.
- The cumulative noncancer HI for construction workers from potential direct contact with soils was 0.5, which is below the range for risk reduction. The ELCR was 1×10^{-5} which falls within the USEPA's target range for risk reduction. The cumulative noncancer HI from potential contact with groundwater is 7, driven by VOCs in groundwater. The ELCR is 6×10^{-4}, driven by vinyl chloride. These risks are higher than the USEPA's target range for risk reduction.

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TABLE E-1
Groundwater to Indoor Air Parameters Used in the Johnson and Ettinger (1991) Model—Residential Land Use
OMC Plant 2

Symbol	Parameter	Description	Value	Units	Sources
T_S	Average Soil/Groundwater Temperature		10	°C	Default value.
L_F	Depth Below Grade to Bottom of Enclosed Space Floor	This is the depth from soil surface to the bottom of the floor in contact with soil.	200	cm	Default value in User's Guide for basement (USEPA 2003).
L_{WT}	Depth Below Grade to Water Table		305	cm	Assumed to be equal to the depth to the top of contamination.
h_A	Thickness of Soil Stratum A		305	cm	Thickness of soil stratum A is assumed to be equal to the depth to the top of contamination.
h_B	Thickness of Soil Stratum B		NA	cm	Not used.
h_C	Thickness of Soil Stratum C		NA	cm	Not used.
	SCS Soil Type Above Water Table		S	unitless	Soils are assumed to be finer near water table. Value is used only to calculate capillary fringe thickness.
	Soil Stratum A SCS Soil Type	Used to estimate soil vapor permeability.	S	unitless	Based on general lithology, assumed sand soil type at depth of approximately 10 feet below ground surface.
k_v	User-defined Soil Vapor Permeability	A parameter associated with convective transport of vapors within the zone of influence of a building. It is related to the size and shape of connected soil pores.	NA	cm^2	Not used.
	Stratum A SCS Soil Type		S	unitless	Based on general lithology for shallow groundwater, assumed sand soil type at depth of approximately 10 feet below ground surface.
ρ_b^A	Stratum A Soil Dry Bulk Density		1.66	g/cm^3	Default value for sand.
n^A	Stratum A Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity.	0.375	unitless	Default value for sand.
θ_w^A	Stratum A Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity.	0.054	cm^3/cm^3	Default value for sand.
ρ_b^B	Stratum B Soil Dry Bulk Density		NA	unitless	Not used.
n^B	Stratum B Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity.	NA	unitless	Not used.
θ_w^B	Stratum B Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity.	NA	cm^3/cm^3	Not used.
ρ_b^C	Stratum C Soil Dry Bulk Density		NA	g/cm^3	Not used.
n^C	Stratum C Total Soil Porosity	Used with water-filled porosity to calculate air-filled porosity.	NA	unitless	Not used.
$\theta_{w\backslash}^C$	Stratum C Soil Water-filled porosity	Used with total porosity to calculate air-filled porosity.	NA	cm^3/cm^3	Not used.
L_{crack}	Enclosed Space Floor Thickness		10	cm	Default (USEPA, 2003).
Δ_P	Soil-Building Pressure Differential		40	$g/cm\text{-}s^2$	Default value for residential building (USEPA 2003). Conservatively used in the absence of an available industrial building value.
L_B	Enclosed Space Floor Length		1000	cm	Based on average size of current onsite structures.
W_B	Enclosed Space Floor Width		1000	cm	Based on average size of current onsite structures.
H_B	Enclosed Space Height		366	cm	Based on average height of enclosed space of current onsite structures.
w	Floor-Wall Seam Crack Width	Represents a gap assumed to exist at the junction between the floor and the foundation perimeter. This gap is due to building design or concrete shrinkage. It represents the only route for soil gas intrusion into a building.	0.1	cm	Default (USEPA, 2003).
ER	Indoor air exchange rate	Building ventilation rate, expressed in units of air changes per hour (ACH).	0.25	(1/h)	Default (USEPA, 2003).
AT_C	Averaging Time for Carcinogens		70	yrs	Default value (USEPA, 2004).
AT_{NC}	Averaging Time for Noncarcinogens		30	yrs	Default value (USEPA, 2004).
ED	Exposure Duration		30	yrs	Default value (USEPA, 2004).
EF	Exposure Frequency		350	days/yr	Default value (USEPA, 2004).
TR	Target Risk for Carcinogens	Used to calculate risk-based groundwater concentration.	NA	unitless	Not used.
THQ	Target Hazard Quotient for Noncarcinogens	Used to calculate risk-based groundwater concentration.	NA	days/yr	Not used.

Notes:
USEPA, 2003. User's Guide for Evaluating Subsurface Vapor Intrusion Into Buildings.

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Soil				
Residential	5/26/2004	SO026	OMC-SO026-0.0/0.5	0–0.5
	5/26/2004	SO-027	OMC-SO-027-0.0/0.5	0–0.5
	5/27/2004	SO-028	OMC-SO-028-0.0/0/5	0–0.5
	5/25/2004	SO-029	OMC-SO-029-0.0/0.5	0–0.5
	5/26/2004	SO030	OMC-SO030-0.0/0.5	0–0.5
	5/26/2004	SO031	OMC-SO031-0.0/0.5	0–0.5
	5/25/2004	SO032	OMC-SO032-0.0/0.5	0–0.5
	5/27/2004	SO033	OMC-SO033-0.0/0.5	0–0.5
	6/9/2004	SO034	OMC-SO034-0.0/0.5	0–0.5
	6/11/2004	SO035	OMC-SO035-0.0/0.5	0–0.5
	6/8/2004	SO036	OMC-SO036-0.0/0.5	0–0.5
	6/27/2003	SO037	OMC-SO037-0.0/0.5	0–0.5
	6/27/2003	SO038	OMC-SO038-0.0/0.5	0–0.5
	6/27/2003	SO039	OMC-SO039-0.0/0.5	0–0.5
	6/27/2003	SO040	OMC-SO040-0.0/0.5	0–0.5
	6/27/2003	SO050	OMC-SO050-0.0/0.5	0–0.5
	6/27/2003	SO051	OMC-SO051-0.0/0.5	0–0.5
	6/27/2003	SO052	OMC-SO052-0.0/0.5	0–0.5
	6/27/2003	SO053	OMC-SO053-0.0/0.5	0–0.5
	6/27/2003	SO054	OMC-SO054-0.0/0.5	0–0.5
	6/27/2003	SO074	OMC-SO074-0.4/0.8	0–0.5
Recreational	2/2/2005	SO-001	OMC-SO-001-0.0/0.5	0–0.5
	2/2/2005	SO-002	OMC-SO-002-0.0/0.5	0–0.5
	1/31/2005	SO-003	OMC-SO-003-0.0/0.5	0–0.5
	2/2/2005	SO-004	OMC-SO-004-0.0/0.5	0–0.5
	2/2/2005	SO-005	OMC-SO-005-0.0/0.5	0–0.5
	2/7/2005	SO006	OMC-SO006-0.0/0.5	0–0.5
	2/7/2005	SO007	OMC-SO007-0.0/0.5	0–0.5
	1/31/2005	SO-008	OMC-SO-008-0.0/0.5	0–0.5
	1/31/2005	SO-009	OMC-SO-009-0.0/0.5	0–0.5
	1/31/2005	SO-010	OMC-SO-010-0.0/0.5	0–0.5
	2/7/2005	SO011	OMC-SO011-0.0/0.5	0–0.5
	2/7/2005	SO012	OMC-SO012-0.0/0.5	0–0.5
	2/7/2005	SO013	OMC-SO013-0.0/0.5	0–0.5
	2/17/2005	SO014	OMC-SO014-0.0/0.5	0–0.5
	2/9/2005	SO015	OMC-SO015-0.3/0.8	0–0.5
	2/17/2005	SO016	OMC-SO016-0.0/0.5	0–0.5
	2/17/2005	SO017	OMC-SO017-0.0/0.5	0–0.5
	2/17/2005	SO018	OMC-SO018-0.0/0.5	0–0.5
	2/17/2005	SO019	OMC-SO019-0.0/0.5	0–0.5
	2/1/2005	SO-020	OMC-SO-020-0.0/0.5	0–0.5
	2/1/2005	SO-021	OMC-SO-021-0.0/0.5	0–0.5
	2/1/2005	SO-022	OMC-SO-022-0.0/0.5	0–0.5
	2/1/2005	SO-023	OMC-SO-023-0.0/0.5	0–0.5
	2/1/2005	SO-024	OMC-SO-024-0.0/0.5	0–0.5
	2/2/2005	SO-025	OMC-SO-025-0.0/0.5	0–0.5
	2/8/2005	SO036	OMC-SO036-0.0/0.5	0–0.5

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Recreational Cont'd.	2/9/2005	SO037	OMC-SO037-0.0/0.5	0–0.5
	2/8/2005	SO038	OMC-SO038-0.0/0.5	0–0.5
	2/8/2005	SO039	OMC-SO039-0.0/0.5	0–0.5
	2/8/2005	SO040	OMC-SO040-0.0/0.5	0–0.5
	2/8/2005	SO041	OMC-SO041-0.0/0.5	0–0.5
	2/8/2005	SO042	OMC-SO042-0.0/0.5	0–0.5
	2/9/2005	SO043	OMC-SO043-0.0/0.5	0–0.5
	2/2/2005	SO-045	OMC-SO-045-0.0/0.5	0–0.5
	3/1/2005	SO059	OMC-SO059-0.0/1.0	0–1.0
	7/28/2004	S-01	S-01(0-3)	0–3
	7/28/2004	S-02	S-02(0-3)	0–3
	7/29/2004	S-03	S-03,0-3	0–3
	7/28/2004	S-04	S-04(0-3)	0–3
	7/28/2004	S-05	S-05(0-3)	0–3
	7/29/2004	S-06	S-06,0-3	0–3
	7/28/2004	S-07	S-07(0-3)	0–3
	7/28/2004	S-08	S-08(0-3)	0–3
	7/29/2004	S-09	S-09,0-3	0–3
	7/28/2004	S-10	S-10(0-3)	0–3
	8/17/2005	S-107	S-107	0-2
	8/17/2005	S-108	S-108	0-2
	8/17/2005	S-109	S-109	0-2
	7/28/2004	S-11	S-11(0-3)	0–3
	8/17/2005	S-116	S-116	0–0.5
	8/17/2005	S-117	S-117	0–0.5
	7/29/2004	S-12	S-12,0-3	0–3
	7/28/2004	S-13	S-13(0-3)	0–3
	7/28/2004	S-14	S-14(0-3)	0–3
	10/8/2004	S-15	S-15;0-3	0–3
	10/8/2004	S-16	S-16;0-3	0–3
	10/8/2004	S-17	S-17;0-3	0–3
	10/8/2004	S-18	S-18;0-3	0–3
	10/8/2004	S-19	S-19;0-3	0–3
	10/8/2004	S-20	S-20;0-3	0–3
	10/8/2004	S-21	S-21;0-3	0–3
	10/8/2004	S-22	S-22;0-3	0–3
	10/8/2004	S-23	S-23;0-3	0–3
	10/8/2004	S-24	S-24;0-3	0–3
	10/8/2004	S-25	S-25;0-3	0–3
	10/8/2004	S-26	S-26;0-3	0–3
	10/8/2004	S-27	S-27;0-3	0–3
	10/8/2004	S-28	S-28;0-3	0–3

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Construction Worker	2/17/2005	SO014	OMC-SO014-0.0/0.5	0–0.5
	2/17/2005	SO014	OMC-SO014-1.5/2.0	1.5–2
	2/9/2005	SO015	OMC-SO015-0.3/0.8	0.3–0.8
	2/9/2005	SO015	OMC-SO015-0.8/1.2	0.8–1.2
	2/17/2005	SO016	OMC-SO016-0.0/0.5	0.0–0.5
	2/17/2005	SO016	OMC-SO016-1.5/2.0	1.5–2.0
	2/17/2005	SO017	OMC-SO017-0.0/0.5	0.0–0.5
	2/17/2005	SO017	OMC-SO017-1.4/2.0	1.4–2.0
	2/17/2005	SO018	OMC-SO018-0.0/0.5	0.0–0.5
	2/17/2005	SO018	OMC-SO018-2.8/3.3	2.8–3.3
	2/17/2005	SO019	OMC-SO019-0.0/0.5	0.0–0.5
	2/17/2005	SO019	OMC-SO019-1.5/2.5	1.5–2.5
	2/7/2005	SO026	OMC-SO026-0.0/0.5	0.0–0.5
	2/7/2005	SO026	OMC-SO026-1.0/2.0	1.0–2.0
	2/1/2005	SO-027	OMC-SO-027-0.0/0.5	0.0–0.5
	2/1/2005	SO-027	OMC-SO-027-1.0/2.0	1.0–2.0
	2/1/2005	SO-028	OMC-SO-028-0.0/0/5	0.0–0.5
	2/1/2005	SO-028	OMC-SO-028-1.5/2.5	1.5–2.5
	2/1/2005	SO-029	OMC-SO-029-0.0/0.5	0.0–0.5
	2/1/2005	SO-029	OMC-SO-029-1.5/2.5	1.5–2.5
	2/17/2005	SO030	OMC-SO030-0.0/0.5	0.0–0.5
	2/17/2005	SO030	OMC-SO030-2.0/3.0	2.0–3.0
	2/7/2005	SO031	OMC-SO031-0.0/0.5	0.0–0.5
	2/7/2005	SO031	OMC-SO031-1.5/2.5	1.5–2.5
	2/9/2005	SO032	OMC-SO032-0.0/0.5	0.0–0.5
	2/9/2005	SO033	OMC-SO033-0.0/0.5	0.0–0.5
	2/9/2005	SO033	OMC-SO033-2.4/2.6	2.4–2.6
	2/9/2005	SO034	OMC-SO034-0.0/0.5	0.0–0.5
	2/9/2005	SO034	OMC-SO034-2.0/3.0	2.0–3.0
	2/8/2005	SO035	OMC-SO035-0.0/0.5	0.0–0.5
	2/8/2005	SO035	OMC-SO035-1.0/2.0	1.0–2.0
	2/8/2005	SO036	OMC-SO036-0.0/0.5	0.0–0.5
	2/8/2005	SO036	OMC-SO036-1.0/2.0	1.0–2.0
	2/9/2005	SO037	OMC-SO037-0.0/0.5	0.0–0.5
	2/9/2005	SO037	OMC-SO037-1.0/2.0	1.0–2.0
	2/8/2005	SO038	OMC-SO038-0.0/0.5	0.0–0.5
	2/8/2005	SO038	OMC-SO038-1.0/2.0	1.0–2.0
	2/8/2005	SO039	OMC-SO039-0.0/0.5	0.0–0.5
	2/8/2005	SO039	OMC-SO039-0.6/1.3	0.6–1.3
	2/8/2005	SO040	OMC-SO040-0.0/0.5	0.0–0.5
	2/8/2005	SO040	OMC-SO040-1.5/2.0	1.5–2.0
	2/10/2005	SO046	OMC-SO046-1.2/2.2	1.2–2.2
	2/10/2005	SO047	OMC-SO047-1.0/2.0	1.0–2.0
	2/11/2005	SO048	OMC-SO048-1.7/2.7	1.7–2.7
	2/11/2005	SO049	OMC-SO049-1.0/2.4	1.0–2.4
	2/17/2005	SO050	OMC-SO050-0.0/0.5	0.0–0.5
	2/17/2005	SO050	OMC-SO050-1.0/1.8	1.0–1.8

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Construction Worker	2/17/2005	SO051	OMC-SO051-0.0/0.5	0.0–0.5
Cont'd	2/17/2005	SO051	OMC-SO051-1.4/3.0	1.4–3.0
	2/17/2005	SO052	OMC-SO052-0.0/0.5	0.0–0.5
	2/17/2005	SO052	OMC-SO052-0.5/1.3	0.5–1.3
	2/17/2005	SO053	OMC-SO053-0.0/0.5	0.0–0.5
	2/17/2005	SO053	OMC-SO053-2.3/3.8	2.3–3.8
	2/17/2005	SO054	OMC-SO054-0.0/0.5	0.0–0.5
	2/17/2005	SO054	OMC-SO054-0.6/2.7	0.6–2.7
	2/22/2005	SO056	OMC-SO056-1.7/2.0	1.7–2.0
	2/23/2005	SO057	OMC-SO057-2.0/3.0	2.0–3.0
	3/1/2005	SO058	OMC-SO058-1.1/1.7	1.1–1.7
	3/1/2005	SO060	OMC-SO060-1.5/2.0	1.5–2.0
	3/15/2005	SO062	OMC-SO062-0.8/2.3	0.8–2.3
	3/16/2005	SO064	OMC-SO064-0.0/1.0	0.0–1.0
	3/21/2005	SO069	OMC-SO069-0.0/1.7	0.0–1.7
	3/22/2005	SO070	OMC-SO070-3.3/4.5	3.3–4.5
	3/24/2005	SO074	OMC-SO074-0.4/0.8	0.4–0.8
	3/24/2005	SO074	OMC-SO074-2.1/2,4	2.1–2,4
	3/24/2005	SO074	OMC-SO074-2.1/2.4	2.1–2.4
	3/29/2005	SO079	OMC-SO079-1.4/2.7	1.4–2.7
	3/29/2005	SO079	OMC-SO079-2.7/3.6	2.7–3.6
Wipe Samples (Porous and Non-Porous)				
	12/14/2004	NPW-001	NPW-001	NA
	12/14/2004	NPW-002	NPW-002	NA
	12/14/2004	NPW-003	NPW-003	NA
	12/14/2004	NPW-004	NPW-004	NA
	12/14/2004	NPW-005	NPW-005	NA
	12/14/2004	NPW-006	NPW-006	NA
	12/14/2004	NPW-007	NPW-007	NA
	12/14/2004	NPW-008	NPW-008	NA
	12/14/2004	NPW-009	NPW-009	NA
	12/14/2004	NPW-010	NPW-010	NA
	12/15/2004	NPW-011	NPW-011	NA
	12/15/2004	NPW-012	NPW-012	NA
	12/15/2004	NPW-013	NPW-013	NA
	12/15/2004	NPW-014	NPW-014	NA
	12/15/2004	NPW-015	NPW-015	NA
	12/15/2004	NPW-016	NPW-016	NA
	12/15/2004	NPW-017	NPW-017	NA
	12/15/2004	NPW-018	NPW-018	NA
	12/15/2004	NPW-019	NPW-019	NA
	12/15/2004	NPW-020	NPW-020	NA
	12/15/2004	NPW-021	NPW-021	NA
	12/15/2004	NPW-022	NPW-022	NA
	12/15/2004	NPW-023	NPW-023	NA
	12/15/2004	NPW-024	NPW-024	NA
	12/15/2004	NPW-025	NPW-025	NA

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Wipe Samples cont'd	12/15/2004	NPW-026	NPW-026	NA
	12/15/2004	NPW-027	NPW-027	NA
	12/15/2004	NPW-028	NPW-028	NA
	12/15/2004	NPW-030	NPW-030	NA
	12/15/2004	NPW-031	NPW-031	NA
	12/15/2004	NPW-032	NPW-032	NA
	12/15/2004	NPW-033	NPW-033	NA
	12/16/2004	NPW-034	NPW-034	NA
	12/16/2004	NPW-035	NPW-035	NA
	12/16/2004	NPW-036	NPW-036	NA
	12/16/2004	NPW-037	NPW-037	NA
	12/16/2004	NPW-038	NPW-038	NA
	12/16/2004	NPW-039	NPW-039	NA
	12/16/2004	NPW-040	NPW-040	NA
	12/16/2004	NPW-041	NPW-041	NA
	12/16/2004	NPW-042	NPW-042	NA
	12/16/2004	NPW-043	NPW-043	NA
	12/16/2004	NPW-044	NPW-044	NA
	12/16/2004	NPW-045	NPW-045	NA
	12/16/2004	NPW-046	NPW-046	NA
	12/16/2004	NPW-047	NPW-047	NA
	12/16/2004	NPW-048	NPW-048	NA
	4/6/2005	OMC-NPW066	OMC-NPW066	NA
	4/6/2005	OMC-NPW067	OMC-NPW067	NA
	4/6/2005	OMC-NPW068	OMC-NPW068	NA
	4/6/2005	OMC-NPW069	OMC-NPW069	NA
	4/6/2005	OMC-NPW070	OMC-NPW070	NA
	4/6/2005	OMC-NPW071	OMC-NPW071	NA
	4/6/2005	OMC-NPW072	OMC-NPW072	NA
	4/6/2005	OMC-NPW073	OMC-NPW073	NA
	4/6/2005	OMC-NPW074	OMC-NPW074	NA
	4/6/2005	OMC-NPW075	OMC-NPW075	NA
	4/6/2005	OMC-NPW076	OMC-NPW076	NA
	4/6/2005	OMC-NPW077	OMC-NPW077	NA
	4/6/2005	OMC-NPW078	OMC-NPW078	NA
	4/6/2005	OMC-NPW079	OMC-NPW079	NA
	4/6/2005	OMC-NPW080	OMC-NPW080	NA
	4/6/2005	OMC-PW062	OMC-PW062	NA
	4/6/2005	OMC-PW063	OMC-PW063	NA
	4/6/2005	OMC-PW064	OMC-PW064	NA
	4/6/2005	OMC-PW065	OMC-PW065	NA
	12/16/2004	PW-001	PW-001	NA
	12/16/2004	PW-002	PW-002	NA
	12/16/2004	PW-003	PW-003	NA
	12/16/2004	PW-004	PW-004	NA
	12/16/2004	PW-005	PW-005	NA
	12/15/2004	PW-006	PW-006	NA

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Wipe Samples cont'd	12/16/2004	PW-007	PW-007	NA
	12/16/2004	PW-008	PW-008	NA
	12/16/2004	PW-009	PW-009	NA
	12/14/2004	PW-010	PW-010	NA
	12/16/2004	PW-012	PW-012	NA
	12/16/2004	PW-013	PW-013	NA
	12/16/2004	PW-014	PW-014	NA
	12/15/2004	PW-015	PW-015	NA
	12/16/2004	PW-016	PW-016	NA
	12/16/2004	PW-017	PW-017	NA
	12/16/2004	PW-018	PW-018	NA
	12/15/2004	PW-019	PW-019	NA
	12/15/2004	PW-020	PW-020	NA
	12/15/2004	PW-021	PW-021	NA
	12/15/2004	PW-022	PW-022	NA
	12/15/2004	PW-023	PW-023	NA
	12/15/2004	PW-024	PW-024	NA
	12/16/2004	PW-025	PW-025	NA
	12/14/2004	PW-027	PW-027	NA
	12/14/2004	PW-028	PW-028	NA
	12/14/2004	PW-029	PW-029	NA
	12/14/2004	PW-030	PW-030	NA
	12/14/2004	PW-031	PW-031	NA
	12/14/2004	PW-032	PW-032	NA
	12/14/2004	PW-033	PW-033	NA
	12/14/2004	PW-034	PW-034	NA
	12/14/2004	PW-035	PW-035	NA
	12/14/2004	PW-036	PW-036	NA
	12/15/2004	PW-037	PW-037	NA
	12/15/2004	PW-038	PW-038	NA
	12/15/2004	PW-039	PW-039	NA
	12/15/2004	PW-040	PW-040	NA
	12/15/2004	PW-041	PW-041	NA
	12/15/2004	PW-042	PW-042	NA
	12/15/2004	PW-043	PW-043	NA
	12/15/2004	PW-044	PW-044	NA
	12/15/2004	PW-045	PW-045	NA
	12/15/2004	PW-046	PW-046	NA
	12/14/2004	PW-047	PW-047	NA
	12/15/2004	PW-048	PW-048	NA
	12/16/2004	PW-049	PW-049	NA
	12/16/2004	PW-050	PW-050	NA
	12/16/2004	PW-051	PW-051	NA
	12/16/2004	PW-052	PW-052	NA
	12/16/2004	PW-053	PW-053	NA
	12/15/2004	PW-054	PW-054	NA

TABLE E-2
Summary of Data Quantitatively Evaluated in Risk Assessment
OMC Plant 2

Medium/ Exposure Unit	Sample Date	Sample Location	Sample ID	Sample Depth Interval (ft bgs)
Wipe Samples cont'd	12/15/2004	PW-055	PW-055	NA
	12/15/2004	PW-056	PW-056	NA
	12/16/2004	PW-057	PW-057	NA
	12/16/2004	PW-058	PW-058	NA
	12/15/2004	PW-059	PW-059	NA
	12/15/2004	PW-060	PW-060	NA
	12/15/2004	PW-061	PW-061	NA
Groundwater				
	4/28/2005	MW003S	OMC-MW003S	NA
	5/2/2005	MW011S	OMC-MW011S	NA
	4/29/2005	MW015S	OMC-MW015S	NA
	4/27/2005	MW100	OMC-MW100	NA
	4/27/2005	MW101	OMC-MW101	NA
	4/28/2005	MW102	OMC-MW102	NA
	4/28/2005	MW14S	OMC-MW14S	NA
	4/26/2005	MW500S	OMC-MW500S	NA
	4/26/2005	MW501S	OMC-MW501S	NA
	5/5/2005	MW502S	OMC-MW502S	NA
	5/5/2005	MW503S	OMC-MW503S	NA
	5/4/2005	MW504S	OMC-MW504S	NA
	5/4/2005	MW505S	OMC-MW505S	NA
	5/4/2005	MW506S	OMC-MW506S	NA
	5/2/2005	MW507S	OMC-MW507S	NA
	4/27/2005	MW508S	OMC-MW508S	NA
	4/29/2005	MW509S	OMC-MW509S	NA
	5/4/2005	MW510S	OMC-MW510S	NA
	5/3/2005	MW511S	OMC-MW511S	NA
	5/3/2005	MW512S	OMC-MW512S	NA
	5/3/2005	MW513S	OMC-MW513S	NA
	5/5/2005	MW514S	OMC-MW514S	NA
	5/2/2005	MW515S	OMC-MW515S	NA
	5/2/2005	MW516S	OMC-MW516S	NA
	5/4/2005	MW517S	OMC-MW517S	NA
	4/27/2005	W013	OMC-W013	NA

Notes:

Wipe sample results provided for combined interior non-porous wipe (NPW) samples (bare metal) and interior porous wipe (PW) samples (painted surfaces, concrete, etc.).

bgs–below ground surface

NA–Not available or not applicable

Metals–Inorganic Constituents

Pest/PCBs–Pesticides and Polychlorinated Biphenyls

SVOCs–Semivolatile Organic Constituents

VOCs–Volatile Organic Constituents

TABLE E-3
Exposure Factors for Estimating Chemical Intakes
OMC Plant 2

Parameter	Units	Construction Worker	Source	Residential Adult	Source	Residential Child	Source	Lifetime Resident	Source	Recreational Adult	Source	Recreational Adolescent	Source	Trespasser	Source
Concentration in Soil (CS)	mg/kg	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a
Concentration in Groundwater (CW)	µg/L	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a	EPC	a
Concentration in Indoor Air (CA-indoor)	mg/m^3	--	--	EPC	b	EPC	b	EPC	b	--	--	--	--	EPC	b
Concentration in Ambient Air (CA-amb)	mg/m^3	EPC	c, j	EPC	c	EPC	c	EPC	c	EPC	c	EPC	c	EPC	c
Soil Ingestion Rate (IR)	mg/day	480	o	100	o	200	o	--	--	100	o	100	o	--	--
Inhalation Rate (IN)	m^3/day	12	e	20	d	12	d	--	--	20	d	12	d	--	--
Inhalation Rate, outdoor residential	m3/day	--	--	1.08	w	0.65	w	--	--	--	--	--	--	--	--
Age-Adjusted Soil Ingestion Factor (IR-S-Adj)	mg-yr/kg-d	--	--	--	--	--	--	114	d	--	--	--	--	--	--
Age-Adjusted Dermal Contact Factor (DA-Adj)	mg-yr/kg-day	--	--	--	--	--	--	361	k	--	--	--	--	--	--
Age-Adjusted Inhalation Factor (IN-Adj)	m^3-yr/kg-d	--	--	--	--	--	--	11.66	d	--	--	--	--	--	--
Body Weight (BW)	kg	70	o	70	o	15	o	70	o	70	o	37	q	70	d
Skin Surface Area (SA)	cm^2	3,300	d	5,700	l	2,800	l	5,700	l	5,700	l	3000	s	420	m
Soil Adherence Factor (SSAF)	mg/cm^2	0.3	l	0.1	l	0.2	l	0.1	l	0.3	u	0.3	r	--	--
Fraction Transferred to Skin	unitless	--	--	--	--	--	--	--	--	--	--	--	--	0.5	f
Particulate Emission Factor (PEF)	(m^3/kg)	1.32E+09 (h)												--	--
Dermal Absorption Factor (DABS)	unitless	Chemical-Specific							Chemical-Specific						
Dermal Absorbed Dose per Event (DAevent)	(mg/cm^2-event)	Calculated—Chemical-Specific							Calculated—Chemical-Specific						
Age-Adjusted Dermal Absorbed Dose per Event (Daevent-adj)	(mg-year/kg-day)	Calculated—Chemical-Specific							Calculated—Chemical-Specific						
Volatilization Factor for Volatile Constituents (VF)	(m^3/kg)	Chemical-Specific							Chemical-Specific						
Exposure Frequency (EF)	days/year	250	t	350	d	350	d	350	d	104	p	104	p	99	n
Exposure Time (ET)	hours/day	8	f	24	f	24	f	24	f	4	f	4	f	--	--
Event Frequency (EV)	events/day	1	f	1	f	1	f	1	f	1	f	1	f	1	f
Exposure Duration (ED)	years	1	o	24	g	6	g	30	g	24	f	9	q	7	f
Averaging Time (non-carcinogenic) (AT)	years	1	o	24	o	6	o	--	--	24	f	9	q	7	f
Averaging Time (carcinogenic) (ATc)	years	70	d	70	d	70	d	70	d	70	d	70	d	70	d

Equations:

Onsite Worker,
Construction Worker

Soil

Ingestion Intake = (mg/kg-day)
$$\frac{CS \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Dermal Intake = (mg/kg-day)
$$\frac{CS \times SA \times SSAF \times DABS \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/year}}$$

Groundwater

(Construction Worker Scenario) Dermal Intake = (mg/kg-day)
$$\frac{DA_{event} \times SA \times EV \times EF \times ED}{BW \times AT \times 365 \text{ days/year}}$$

Indoor/Ambient Air (b,c)

Inhalation Intake = (mg/kg-day)
$$\frac{CA \times IN \times EF \times ED}{BW \times AT \times 365 \text{ days/year}}$$

(Construction Worker Scenario) Inhalation Intake = (mg/kg-day)
$$\frac{CA \times IN \times ET \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/year}}$$

TABLE E-3
Exposure Factors for Estimating Chemical Intakes
OMC Plant 2

Notes:

a. EPC - Exposure Point Concentration
b. Indoor air concentrations modeled based on the maximum detected soil gas concentrations.
c. Ambient air concentrations calculated using VF and PEF values for soil to ambient air pathway (see equation below).
CA-amb = CS x [(1 / VF) + (1 / PEF)]
d. USEPA Region III Risk-Based Concentration Table: Technical Background Information. April 16, 2003.
e. Construction worker = Short-term exposure, outdoor workers with moderate activity level (1.5 m^3/hr) for 8 hours/day (Exposure Factors Handbook, USEPA 1997).
f. Best professional judgment.
g. Exposure duration for residents is assumed to be 30 years total. For carcinogens, exposures are combined for children (6 years) and adults (24 years).
h. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24. USEPA 2002.
j. Ambient air concentrations calculated using a two-film volatilization model for the groundwater-to-ambient air pathway.
k. Calculated: (ED-A x SA-A x SSAF-A / BW-A)
l. Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment) Final. 2004.
m. The skin surface of the hands is 840 cm2; one-half of this skin surface (the palm and bottom surfaces of the fingers), or 420 cm2 is assumed to come into contact with the contaminated surface.
n. Exposure frequency is 50% of the average (1971–2000) number of days during April through October with minimum temperatures higher than 32 degrees Fahrenheit at climate station 119029 WAUKEGAN 2 WNW, IL. (http://mrcc.sws.uiuc.edu/climate_midwest/historical/grow/il/119029_gsum.html).
o. EPA, 1991.
p. Professional Judgment assuming 2 days per week throughout the year.
q. EPA, 1997. Assumes that the recreator would be an adolescent aged 6–14 years. Body weight is the mean body weight for boys and girls ages 6–14 years.
r. EPA, 2004. AF for soccer players, teens in moist conditions, 95th percentile.
s. EPA, 1997. Calculated based on mean skin surface area for boys and girls, ages 6–14 years for face, forearms, hands, and lower legs.
t. Professional Judgment assuming a construction project could take up to 1 year, with 2 weeks off for vacation/holiday.
u. EPA, 2004. Assumed AF for Gardeners, 95th percentile.
v. EPA, 2004. Assumes receptor is wearing a short-sleeved shirt, shorts, and shoes.
w. EPA, 1997, Table 15-20. Calculated based on average of 120 min/day-spring, 99 min/day-summer, 87.5 min/day fall. Winter expected to be snow covered with minimized volatilization due to cold temperatures.)

TABLE E-4
Calculation of RME Chemical Non-Cancer Hazards for Soil (0–0.5 fee/t bgs)—Residential (Adult) Scenario
OMC Plant 2

Chemical	CAS	Soil Exposure Point Concentration (mg/kg)	Ambient Air Exposure Point Concentration ($\mu g/m^3$)	Oral Reference Dose (RfD) (mg/kg-day)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	ABS Unitless	Noncarcinogenic: Estimated Ingestion Intake (mg/kg-day)	Noncarcinogenic: Estimated Dermal Intake (mg/kg-day)	Noncarcinogenic: Estimated Inhalation Intake (mg/kg-day)	Noncarcinogenic: Ingestion HQ (Intake/RfD)	Noncarcinogenic: Dermal HQ (Intake/RfD)	Noncarcinogenic: Inhalation HQ (Intake/RfD)	Noncarcinogenic: Hazard Quotient (Intake/RfD)
Benzene	71-43-2	7.40E-03	2.71E-06	4.0E-03	4.0E-03	8.6E-03	1.0E+00	1.0E-08	5.8E-08	7.4E-07	2.5E-06	1.4E-05	8.6E-05	1.0E-04
Carbon disulfide	75-15-0	3.00E-03	2.52E-06	1.0E-01	1.0E-01	2.0E-01	1.0E+00	4.1E-09	2.3E-08	6.9E-07	4.1E-08	2.3E-07	3.5E-06	3.7E-06
Methylene chloride	75-09-2	6.00E-03	2.41E-06	6.0E-02	6.0E-02	3.0E-01	1.0E+00	8.2E-09	4.7E-08	6.6E-07	1.4E-07	7.8E-07	2.2E-06	3.1E-06
Toluene	95-49-8	2.98E-02	7.48E-06	2.0E-02	8.0E-02	NA	1.0E+00	4.1E-08	2.3E-07	2.0E-06	2.0E-06	2.9E-06	--	4.9E-06
Trichloroethylene	79-01-6	2.15E-02	6.59E-06	3.0E-04	3.0E-04	1.0E-02	1.0E+00	2.9E-08	1.7E-07	1.8E-06	9.8E-05	5.6E-04	1.8E-04	8.4E-04
2-Methylnaphthalene	91-57-6	3.00E+00	2.27E-09	4.0E-03	4.0E-03	NA	1.0E+00	4.1E-06	2.3E-05	6.2E-10	1.0E-03	5.9E-03	--	6.9E-03
Acenaphthene	83-32-9	1.12E+01	8.45E-09	6.0E-02	6.0E-02	NA	1.0E+00	1.5E-05	8.7E-05	2.3E-09	2.5E-04	1.5E-03	--	1.7E-03
Acetophenone	98-86-2	1.30E-01	9.85E-11	1.0E-01	1.0E-01	NA	1.0E+00	1.8E-07	1.0E-06	2.7E-11	1.8E-06	1.0E-05	--	1.2E-05
Anthracene	120-12-7	1.52E+01	1.15E-08	3.0E-01	3.0E-01	NA	1.0E+00	2.1E-05	1.2E-04	3.2E-09	6.9E-05	4.0E-04	--	4.6E-04
Benzo(a)anthracene	56-55-3	1.71E+01	1.29E-08	NA	NA	NA	1.3E-01	2.3E-05	1.7E-05	3.5E-09	NA	--	--	--
Benzo(a)pyrene	50-32-8	1.02E+01	7.72E-09	NA	NA	NA	1.3E-01	1.4E-05	1.0E-05	2.1E-09	NA	--	--	--
Benzo(b)fluoranthene	205-99-2	1.88E+01	1.42E-08	NA	NA	NA	1.3E-01	2.6E-05	1.9E-05	3.9E-09	NA	--	--	--
Benzo(g,h,i)perylene	198-55-0	1.11E+01	8.37E-09	NA	NA	NA	1.0E-01	1.5E-05	8.6E-06	2.3E-09	NA	--	--	--
Benzo(k)fluoranthene	207-08-9	8.33E+00	6.31E-09	NA	NA	NA	1.3E-01	1.1E-05	8.5E-06	1.7E-09	NA	--	--	--
bis(2-Ethylhexyl) phthalate	117-81-7	3.10E+00	2.35E-09	2.0E-02	2.0E-02	NA	1.0E+00	4.2E-06	2.4E-05	6.4E-10	2.1E-04	1.2E-03	--	1.4E-03
Carbazole	86-74-8	6.88E+00	5.21E-09	NA	NA	NA	1.0E+00	9.4E-06	5.4E-05	1.4E-09	NA	--	--	--
Dibenz(a,h)anthracene	53-70-3	7.34E+00	5.56E-09	NA	NA	NA	1.3E-01	1.0E-05	7.4E-06	1.5E-09	NA	--	--	--
Dibenzofuran	132-64-9	9.58E+00	7.25E-09	NA	NA	NA	1.0E+00	1.3E-05	7.5E-05	2.0E-09	NA	--	--	--
Di-n-butyl phthalate	84-74-2	3.90E-01	2.95E-10	1.0E-01	1.0E-01	NA	1.0E+00	5.3E-07	3.0E-06	8.1E-11	5.3E-06	3.0E-05	--	3.6E-05
Fluoranthene	206-44-0	6.68E+01	5.06E-08	4.0E-02	4.0E-02	NA	1.0E+00	9.2E-05	5.2E-04	1.4E-08	2.3E-03	1.3E-02	--	1.5E-02
Fluorene	86-73-7	1.03E+01	7.82E-09	4.0E-02	4.0E-02	NA	1.0E+00	1.4E-05	8.1E-05	2.1E-09	3.5E-04	2.0E-03	--	2.4E-03
Hexachlorobenzene	118-74-1	2.30E-01	1.74E-10	8.0E-04	8.0E-04	NA	1.0E+00	3.2E-07	1.8E-06	4.8E-11	3.9E-04	2.2E-03	--	2.6E-03
Indeno(1,2,3-c,d)pyrene	193-39-5	1.31E+01	9.90E-09	NA	NA	NA	1.3E-01	1.8E-05	1.3E-05	2.7E-09	NA	--	--	--
Naphthalene	91-20-3	3.02E+00	2.29E-09	2.0E-02	2.0E-02	9.0E-04	1.0E+00	4.1E-06	2.4E-05	6.3E-10	2.1E-04	1.2E-03	7.0E-07	1.4E-03
Phenanthrene	85-01-8	6.39E+01	4.84E-08	NA	NA	NA	1.0E+00	8.8E-05	5.0E-04	1.3E-08	NA	--	--	--
Pyrene	129-00-0	4.14E+01	3.14E-08	3.0E-02	3.0E-02	NA	1.0E+00	5.7E-05	3.2E-04	8.6E-09	1.9E-03	1.1E-02	--	1.3E-02
PCB-1248 (Arochlor 1248)	12672-29-6	2.40E+00	1.82E-09	NA	NA	NA	1.4E-01	3.3E-06	2.6E-06	5.0E-10	NA	--	--	--
PCB-1254 (Arochlor 1254)	11097-69-1	1.51E+00	1.14E-09	2.0E-05	2.0E-05	NA	1.4E-01	2.1E-06	1.6E-06	3.1E-10	1.0E-01	8.2E-02	--	1.9E-01
PCB-1260 (Arochlor 1260)	11096-82-5	2.98E-01	2.26E-10	NA	NA	NA	1.4E-01	4.1E-07	3.3E-07	6.2E-11	NA	--	--	--
Hazard Index (Sum of Hazard Quotient):											**0.1**	**0.1**	**0.0003**	**0.2**

TABLE E-5
Calculation of RME Chemical Non-Cancer Hazards for Soil (0–0.5 feet bgs)—Residential (Child) Scenario
OMC Plant 2

Chemical	CAS	Soil Exposure Point Concentration (mg/kg)	Ambient Air Exposure Point Concentration (μg/m^3)	Oral Reference Dose (RfD) (mg/kg-day)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	ABS Unitless	Noncarcinogenic						
								Estimated Ingestion Intake (mg/kg-day)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Ingestion HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Hazard Quotient (Intake/RfD)
Benzene	71-43-2	7.40E-03	2.71E-06	4.0E-03	4.0E-03	8.6E-03	1.0E+00	9.5E-08	2.6E-07	1.7E-06	2.4E-05	6.6E-05	2.0E-04	2.9E-04
Carbon disulfide	75-15-0	3.00E-03	2.52E-06	1.0E-01	1.0E-01	2.0E-01	1.0E+00	3.8E-08	1.1E-07	1.6E-06	3.8E-07	1.1E-06	NA	9.5E-06
Methylene chloride	75-09-2	6.00E-03	2.41E-06	6.0E-02	6.0E-02	3.0E-01	1.0E+00	7.7E-08	2.1E-07	1.5E-06	1.3E-06	3.6E-06	5.1E-06	1.0E-05
Toluene	95-49-8	2.98E-02	7.48E-06	2.0E-02	8.0E-02	NA	1.0E+00	3.8E-07	1.1E-06	4.8E-06	NA	NA	NA	NA
Trichloroethylene	79-01-6	2.15E-02	6.59E-06	3.0E-04	4.0E-01	1.0E-02	1.0E+00	2.7E-07	7.7E-07	4.2E-06	9.2E-04	2.6E-03	4.2E-04	3.9E-03
2-Methylnaphthalene	91-57-6	3.00E+00	2.27E-09	4.0E-03	4.0E-03	NA	1.0E+00	3.8E-05	1.1E-04	1.5E-09	9.6E-03	2.7E-02	NA	3.6E-02
Acenaphthene	83-32-9	1.12E+01	8.45E-09	6.0E-02	6.0E-02	NA	1.0E+00	1.4E-04	4.0E-04	5.4E-09	2.4E-03	6.7E-03	NA	9.0E-03
Acetophenone	98-86-2	1.30E-01	9.85E-11	1.0E-01	1.0E-01	NA	1.0E+00	1.7E-06	4.7E-06	6.3E-11	1.7E-05	4.7E-05	NA	6.3E-05
Anthracene	120-12-7	1.52E+01	1.15E-08	3.0E-01	3.0E-01	NA	1.0E+00	1.9E-04	5.4E-04	7.4E-09	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	1.71E+01	1.29E-08	NA	NA	NA	1.3E-01	2.2E-04	7.9E-05	8.3E-09	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	1.02E+01	7.72E-09	NA	NA	NA	1.3E-01	1.3E-04	4.7E-05	4.9E-09	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	1.88E+01	1.42E-08	NA	NA	NA	1.3E-01	2.4E-04	8.7E-05	9.1E-09	NA	NA	NA	NA
Benzo(g,h,i)perylene	198-55-0	1.11E+01	8.37E-09	NA	NA	NA	1.0E-01	1.4E-04	4.0E-05	5.4E-09	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	8.33E+00	6.31E-09	NA	NA	NA	1.3E-01	1.1E-04	3.9E-05	4.0E-09	NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	117-81-7	3.10E+00	2.35E-09	2.0E-02	2.0E-02	NA	1.0E+00	4.0E-05	1.1E-04	1.5E-09	NA	NA	NA	NA
Carbazole	86-74-8	6.88E+00	5.21E-09	NA	NA	NA	1.0E+00	8.8E-05	2.5E-04	3.3E-09	NA	NA	NA	NA
Dibenz(a,h)anthracene	53-70-3	7.34E+00	5.56E-09	NA	NA	NA	1.3E-01	9.4E-05	3.4E-05	3.6E-09	NA	NA	NA	NA
Dibenzofuran	132-64-9	9.58E+00	7.25E-09	NA	NA	NA	1.0E+00	1.2E-04	3.4E-04	4.6E-09	NA	NA	NA	NA
Di-n-butyl phthalate	84-74-2	3.90E-01	2.95E-10	1.0E-01	1.0E-01	NA	1.0E+00	5.0E-06	1.4E-05	1.9E-10	5.0E-05	1.4E-04	NA	1.9E-04
Fluoranthene	206-44-0	6.68E+01	5.06E-08	4.0E-02	4.0E-02	NA	1.0E+00	8.5E-04	2.4E-03	3.2E-08	2.1E-02	6.0E-02	NA	8.1E-02
Fluorene	86-73-7	1.03E+01	7.82E-09	4.0E-02	4.0E-02	NA	1.0E+00	1.3E-04	3.7E-04	5.0E-09	3.3E-03	9.2E-03	NA	1.3E-02
Hexachlorobenzene	118-74-1	2.30E-01	1.74E-10	8.0E-04	8.0E-04	NA	1.0E+00	2.9E-06	8.2E-06	1.1E-10	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	193-39-5	1.31E+01	9.90E-09	NA	NA	NA	1.3E-01	1.7E-04	6.1E-05	6.3E-09	NA	NA	NA	NA
Naphthalene	91-20-3	3.02E+00	2.29E-09	2.0E-02	2.0E-02	9.0E-04	1.0E+00	3.9E-05	1.1E-04	1.5E-09	NA	NA	NA	NA
Phenanthrene	85-01-8	6.39E+01	4.84E-08	NA	NA	NA	1.0E+00	8.2E-04	2.3E-03	3.1E-08	NA	NA	NA	NA
Pyrene	129-00-0	4.14E+01	3.14E-08	3.0E-02	3.0E-02	NA	1.0E+00	5.3E-04	1.5E-03	2.0E-08	NA	NA	NA	NA
PCB-1248 (Arochlor 1248)	12672-29-6	2.40E+00	1.82E-09	NA	NA	NA	1.4E-01	3.1E-05	1.2E-05	1.2E-09	NA	NA	NA	NA
PCB-1254 (Arochlor 1254)	11097-69-1	1.51E+00	1.14E-09	2.0E-05	2.0E-05	NA	1.4E-01	1.9E-05	7.6E-06	7.3E-10	NA	NA	NA	NA
PCB-1260 (Arochlor 1260)	11096-82-5	2.98E-01	2.26E-10	NA	NA	NA	1.4E-01	3.8E-06	1.5E-06	1.4E-10	NA	NA	NA	NA
Hazard Index (Sum of Hazard Quotient):											**0.04**	**0.1**	**0.001**	**0.1**

TABLE E-6
Calculation of RME Chemical Cancer Risks for Soil (0–0.5 feet bgs)—Residential (Lifetime—Child/Adult) Scenario
OMC Plant 2

								Carcinogenic						
Chemical	**CAS**	**Soil Exposure Point Concentration (mg/kg)**	**Ambient Air Exposure Point Concentration (μg/m^3)**	**Oral Slope Factor (SF) (kg-day/mg)**	**Dermal Slope Factor (kg-day/mg)**	**Inhalation Slope Factor (SF) (kg-day/mg)**	**ABS Unitless**	**Estimated Ingestion Intake (mg/kg-day)**	**Estimated Dermal Intake (mg/kg-day)**	**Estimated Inhalation Intake (mg/kg-day)**	**Ingestion ELCR (Intake * SF)**	**Dermal ELCR**	**Inhalation ELCR**	**Excess Cancer Risk (Intake * SF)**
Benzene	71-43-2	7.40E-03	2.71E-06	5.5E-02	5.5E-02	2.7E-02	1.0E+00	1.2E-08	4.3E-08	4.3E-07	6.4E-10	2.3E-09	1.2E-08	1.5E-08
Carbon disulfide	75-15-0	3.00E-03	2.52E-06	NA	NA	NA	1.0E+00	4.7E-09	1.7E-08	4.0E-07	NA	--	--	--
Methylene chloride	75-09-2	6.00E-03	2.41E-06	7.5E-03	7.5E-03	1.7E-03	1.0E+00	9.4E-09	3.4E-08	3.8E-07	7.0E-11	2.6E-10	6.3E-10	9.6E-10
Toluene	95-49-8	2.98E-02	7.48E-06	NA	NA	NA	1.0E+00	4.6E-08	1.7E-07	1.2E-06	NA	--	--	--
Trichloroethylene	79-01-6	2.15E-02	6.59E-06	4.0E-01	4.0E-01	4.0E-01	1.0E+00	3.4E-08	1.2E-07	1.1E-06	1.3E-08	4.9E-08	4.2E-07	4.8E-07
2-Methylnaphthalene	91-57-6	3.00E+00	2.27E-09	NA	NA	NA	1.0E+00	4.7E-06	1.7E-05	3.6E-10	NA	--	--	--
Acenaphthene	83-32-9	1.12E+01	8.45E-09	NA	NA	NA	1.0E+00	1.7E-05	6.4E-05	1.3E-09	NA	--	--	--
Acetophenone	98-86-2	1.30E-01	9.85E-11	NA	NA	NA	1.0E+00	2.0E-07	7.5E-07	1.6E-11	NA	--	--	--
Anthracene	120-12-7	1.52E+01	1.15E-08	NA	NA	NA	1.0E+00	2.4E-05	8.7E-05	1.8E-09	NA	--	--	--
Benzo(a)anthracene	56-55-3	1.71E+01	1.29E-08	7.3E-01	7.3E-01	NA	1.3E-01	2.7E-05	1.3E-05	2.1E-09	1.9E-05	9.3E-06	--	2.9E-05
Benzo(a)pyrene	50-32-8	1.02E+01	7.72E-09	7.3E+00	7.3E+00	3.1E+00	1.3E-01	1.6E-05	7.6E-06	1.2E-09	1.2E-04	5.6E-05	3.8E-09	1.7E-04
Benzo(b)fluoranthene	205-99-2	1.88E+01	1.42E-08	7.3E-01	7.3E-01	NA	1.3E-01	2.9E-05	1.4E-05	2.3E-09	NA	1.0E-05	--	3.2E-05
Benzo(g,h,i)perylene	198-55-0	1.11E+01	8.37E-09	NA	NA	NA	1.0E-01	1.7E-05	6.4E-06	1.3E-09	NA	--	--	--
Benzo(k)fluoranthene	207-08-9	8.33E+00	6.31E-09	7.3E-02	7.3E-02	NA	1.3E-01	1.3E-05	6.2E-06	1.0E-09	9.5E-07	4.5E-07	--	1.4E-06
bis(2-Ethylhexyl) phthalate	117-81-7	3.10E+00	2.35E-09	1.4E-02	1.4E-02	NA	1.0E+00	4.8E-06	1.8E-05	3.8E-10	6.8E-08	2.5E-07	--	3.2E-07
Carbazole	86-74-8	6.88E+00	5.21E-09	2.0E-02	2.0E-02	NA	1.0E+00	1.1E-05	4.0E-05	8.3E-10	NA	7.9E-07	--	1.0E-06
Dibenz(a,h)anthracene	53-70-3	7.34E+00	5.56E-09	7.3E+00	7.3E+00	NA	1.3E-01	1.1E-05	5.5E-06	8.9E-10	NA	4.0E-05	--	1.2E-04
Dibenzofuran	132-64-9	9.58E+00	7.25E-09	NA	NA	NA	1.0E+00	1.5E-05	5.5E-05	1.2E-09	NA	--	--	--
Di-n-butyl phthalate	84-74-2	3.90E-01	2.95E-10	NA	NA	NA	1.0E+00	6.1E-07	2.2E-06	4.7E-11	NA	--	--	--
Fluoranthene	206-44-0	6.68E+01	5.06E-08	NA	NA	NA	1.0E+00	1.0E-04	3.8E-04	8.1E-09	NA	--	--	--
Fluorene	86-73-7	1.03E+01	7.82E-09	NA	NA	NA	1.0E+00	1.6E-05	5.9E-05	1.2E-09	NA	--	--	--
Hexachlorobenzene	118-74-1	2.30E-01	1.74E-10	1.6E+00	1.6E+00	1.6E+00	1.0E+00	3.6E-07	1.3E-06	2.8E-11	5.7E-07	2.1E-06	4.5E-11	2.7E-06
Indeno(1,2,3-c,d)pyrene	193-39-5	1.31E+01	9.90E-09	7.3E-01	7.3E-01	NA	1.3E-01	2.0E-05	9.8E-06	1.6E-09	NA	7.1E-06	--	2.2E-05
Naphthalene	91-20-3	3.02E+00	2.29E-09	NA	NA	NA	1.0E+00	4.7E-06	1.7E-05	3.7E-10	NA	--	--	--
Phenanthrene	85-01-8	6.39E+01	4.84E-08	NA	NA	NA	1.0E+00	1.0E-04	3.7E-04	7.7E-09	NA	--	--	--
Pyrene	129-00-0	4.14E+01	3.14E-08	NA	NA	NA	1.0E+00	6.5E-05	2.4E-04	5.0E-09	NA	--	--	--
PCB-1248 (Arochlor 1248)	12672-29-6	2.40E+00	1.82E-09	2.0E+00	2.0E+00	2.0E+00	1.4E-01	3.7E-06	1.9E-06	2.9E-10	7.5E-06	3.9E-06	5.8E-10	1.1E-05
PCB-1254 (Arochlor 1254)	11097-69-1	1.51E+00	1.14E-09	2.0E+00	2.0E+00	2.0E+00	1.4E-01	2.4E-06	1.2E-06	1.8E-10	4.7E-06	2.4E-06	3.7E-10	7.2E-06
PCB-1260 (Arochlor 1260)	11096-82-5	2.98E-01	2.26E-10	2.0E+00	2.0E+00	2.0E+00	1.4E-01	4.7E-07	2.4E-07	3.6E-11	9.3E-07	4.8E-07	7.2E-11	1.4E-06
Total Excess Lifetime Cancer Risk:											**2E-04**	**1E-04**	**4E-07**	**4E-04**

Note:
NA = Not applicable or not available

TABLE E-7

Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Soil (0–0.5 feet bgs)—Construction Worker Scenario

OMC Plant 2

Chemical	CAS	Soil Exposure Point Concentration (mg/kg)	Ambient Air Exposure Point Concentration ($\mu g/m^3$)	Oral Reference Dose (RfD) (mg/kg-day)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	Oral Slope Factor (SF) (kg-day/mg)	Dermal Slope Factor (SF) (kg-day/mg)	Inhalation Slope Factor (SF) (kg-day/mg)	ABS Unitless	Noncarcinogenic						
											Estimated Ingestion Intake (mg/kg-day)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Ingestion HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Hazard Quotient (Intake/RfD)
Benzene	71-43-2	7.40E-03	2.71E-06	4.0E-03	4.0E-03	8.6E-03	5.5E-02	5.5E-02	2.7E-02	1.0E+00	3.5E-08	7.2E-08	4.5E-08	8.9E-06	1.8E-05	5.2E-06	3.2E-05
Carbon disulfide	75-15-0	3.00E-03	2.52E-06	1.0E-01	1.0E-01	2.0E-01	NA	NA	NA	1.0E+00	1.4E-08	2.9E-08	4.2E-08	1.4E-07	2.9E-07	NA	6.4E-07
Methylene chloride	75-09-2	6.00E-03	2.41E-06	6.0E-02	6.0E-02	3.0E-01	7.5E-03	7.5E-03	1.7E-03	1.0E+00	2.9E-08	5.8E-08	4.0E-08	4.8E-07	9.7E-07	1.3E-07	1.6E-06
Toluene	95-49-8	2.98E-02	7.48E-06	2.0E-02	8.0E-02	NA	NA	NA	NA	1.0E+00	1.4E-07	2.9E-07	1.2E-07	7.1E-06	3.6E-06	NA	1.1E-05
Trichloroethylene	79-01-6	2.15E-02	6.59E-06	3.0E-04	3.0E-04	1.0E-02	4.0E-01	4.0E-01	4.0E-01	1.0E+00	1.0E-07	2.1E-07	1.1E-07	3.4E-04	6.9E-04	1.1E-05	1.0E-03
2-Methylnaphthalene	91-57-6	3.00E+00	2.27E-09	4.0E-03	4.0E-03	NA	NA	NA	NA	1.0E+00	1.4E-05	2.9E-05	3.8E-11	3.6E-03	7.3E-03	NA	1.1E-02
Acenaphthene	83-32-9	1.12E+01	8.45E-09	6.0E-02	6.0E-02	NA	NA	NA	NA	1.0E+00	5.3E-05	1.1E-04	1.4E-10	8.9E-04	1.8E-03	NA	2.7E-03
Acetophenone	98-86-2	1.30E-01	9.85E-11	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	6.2E-07	1.3E-06	1.6E-12	6.2E-06	1.3E-05	NA	1.9E-05
Anthracene	120-12-7	1.52E+01	1.15E-08	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E+00	7.3E-05	1.5E-04	1.9E-10	NA	NA	NA	NA
Benzo(a)anthracene	56-55-3	1.71E+01	1.29E-08	NA	NA	NA	7.3E-01	7.3E-01	7.3E-01	1.3E-01	8.2E-05	2.1E-05	2.2E-10	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	1.02E+01	7.72E-09	NA	NA	NA	7.3E+00	7.3E+00	3.1E+00	1.3E-01	4.9E-05	1.3E-05	1.3E-10	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	1.88E+01	1.42E-08	NA	NA	NA	7.3E-01	7.3E-01	7.3E-01	1.3E-01	9.0E-05	2.4E-05	2.4E-10	NA	NA	NA	NA
Benzo(g,h,i)perylene	198-55-0	1.11E+01	8.37E-09	NA	NA	NA	NA	NA	NA	1.0E-01	5.3E-05	1.1E-05	1.4E-10	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	8.33E+00	6.31E-09	NA	NA	NA	7.3E-02	7.3E-02	7.3E-02	1.3E-01	4.0E-05	1.0E-05	1.1E-10	NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	117-81-7	3.10E+00	2.35E-09	2.0E-02	2.0E-02	NA	1.4E-02	1.4E-02	1.4E-02	1.0E+00	1.5E-05	3.0E-05	3.9E-11	NA	NA	NA	NA
Carbazole	86-74-8	6.88E+00	5.21E-09	NA	NA	NA	NA	NA	NA	1.0E+00	3.3E-05	6.7E-05	8.7E-11	NA	NA	NA	NA
Dibenz(a,h)anthracene	53-70-3	7.34E+00	5.56E-09	NA	NA	NA	7.3E+00	7.3E+00	7.3E+00	1.3E-01	3.5E-05	9.2E-06	9.2E-11	NA	NA	NA	NA
Dibenzofuran	132-64-9	9.58E+00	7.25E-09	NA	NA	NA	NA	NA	NA	1.0E+00	4.6E-05	9.3E-05	1.2E-10	NA	NA	NA	NA
Di-n-butyl phthalate	84-74-2	3.90E-01	2.95E-10	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	1.9E-06	3.8E-06	4.9E-12	1.9E-05	3.8E-05	NA	5.6E-05
Fluoranthene	206-44-0	6.68E+01	5.06E-08	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	3.2E-04	6.5E-04	8.4E-10	8.0E-03	1.6E-02	NA	2.4E-02
Fluorene	86-73-7	1.03E+01	7.82E-09	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	4.9E-05	1.0E-04	1.3E-10	1.2E-03	2.5E-03	NA	3.7E-03
Hexachlorobenzene	118-74-1	2.30E-01	1.74E-10	8.0E-04	8.0E-04	NA	1.6E+00	1.6E+00	1.6E+00	1.0E+00	1.1E-06	2.2E-06	2.9E-12	1.4E-03	2.8E-03	NA	4.2E-03
Indeno(1,2,3-c,d)pyrene	193-39-5	1.31E+01	9.90E-09	NA	NA	NA	7.3E-01	7.3E-01	7.3E-01	1.3E-01	6.3E-05	1.6E-05	1.6E-10	NA	NA	NA	NA
Naphthalene	91-20-3	3.02E+00	2.29E-09	2.0E-02	2.0E-02	9.0E-04	NA	NA	NA	1.0E+00	1.4E-05	2.9E-05	3.8E-11	NA	NA	NA	NA
Phenanthrene	85-01-8	6.39E+01	4.84E-08	3.0E-02	3.0E-02	NA	NA	NA	NA	1.0E+00	3.1E-04	6.2E-04	8.1E-10	NA	NA	NA	NA
Pyrene	129-00-0	4.14E+01	3.14E-08	3.0E-02	3.0E-02	NA	NA	NA	NA	1.0E+00	2.0E-04	4.0E-04	5.2E-10	6.6E-03	1.3E-02	NA	2.0E-02
PCB-1248 (Arochlor 1248)	12672-29-6	2.40E+00	1.82E-09	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	1.1E-05	3.3E-06	3.0E-11	NA	NA	NA	NA
PCB-1254 (Arochlor 1254)	11097-69-1	1.51E+00	1.14E-09	2.0E-05	2.0E-05	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	7.2E-06	2.0E-06	1.9E-11	3.6E-01	1.0E-01	NA	4.6E-01
PCB-1260 (Arochlor 1260)	11096-82-5	2.98E-01	2.26E-10	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	1.4E-06	4.0E-07	3.8E-12	NA	NA	NA	NA
Hazard Index (Sum of Hazard Quotient):														**0.4**	**0.1**	**0.00002**	**0.5**
Total Excess Liftetime Cancer Risk:																	

Note:

NA = Not applicable or not available

TABLE E-8
Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Soil (0–0.5 feet bgs)—Recreational (Adult) Scenario
OMC Plant 2

Chemical	CAS	Soil Exposure Point Concentration (mg/kg)	Ambient Air Exposure Point Concentration (μg/m^3)	Oral Reference Dose (RfD) (mg/kg-day)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	Oral Slope Factor (SF) (kg-day/mg)	Dermal Slope Factor (SF) (kg-day/mg)	Inhalation Slope Factor (SF) (kg-day/mg)	ABS Unitless	Noncarcinogenic						
											Estimated Ingestion Intake (mg/kg-day)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Ingestion HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Hazard Quotient (Intake/RfD)
Acetone	67-64-1	1.67E-02	1.33E-06	9.0E-01	9.0E-01	NA	NA	NA	NA	1.0E+00	6.5E-09	1.1E-07	8.8E-09	7.2E-09	1.2E-07	NA	1.3E-07
Carbon disulfide	75-15-0	6.00E-03	5.04E-06	1.0E-01	1.0E-01	2.0E-01	NA	NA	NA	1.0E+00	2.3E-09	4.0E-08	3.4E-08	2.3E-08	4.0E-07	1.7E-07	5.9E-07
cis-1,2-Dichloroethylene	156-59-2	6.85E-03	5.19E-12	1.0E-02	1.0E-02	1.0E-02	NA	NA	NA	1.0E+00	2.7E-09	4.6E-08	3.5E-14	2.7E-07	4.6E-06	3.5E-12	4.9E-06
Cyclohexane	110-82-7	6.53E-03	5.99E-06	NA	NA	1.7E+00	NA	NA	NA	1.0E+00	2.6E-09	4.4E-08	4.0E-08	NA	NA	2.3E-08	2.3E-08
Methylene chloride	75-09-2	5.00E-03	2.00E-06	6.0E-02	6.0E-02	3.0E-01	7.5E-03	7.5E-03	1.7E-03	1.0E+00	2.0E-09	3.3E-08	1.3E-08	3.3E-08	5.6E-07	4.4E-08	6.3E-07
Toluene	95-49-8	2.04E-02	5.13E-06	2.0E-02	2.0E-02	NA	NA	NA	NA	1.0E+00	8.0E-09	1.4E-07	3.4E-08	4.0E-07	6.8E-06	NA	7.2E-06
Trichloroethylene	79-01-6	3.09E-02	9.47E-06	3.0E-04	3.0E-04	1.0E-02	4.0E-01	4.0E-01	4.0E-01	1.0E+00	1.2E-08	2.1E-07	6.3E-08	4.0E-05	6.9E-04	6.3E-06	7.3E-04
2-Methylnaphthalene	91-57-6	9.00E-01	6.82E-10	4.0E-03	4.0E-03	NA	NA	NA	NA	1.0E+00	3.5E-07	6.0E-06	4.5E-12	8.8E-05	1.5E-03	NA	1.6E-03
Acenaphthene	83-32-9	4.09E+00	3.10E-09	6.0E-02	6.0E-02	NA	NA	NA	NA	1.0E+00	1.6E-06	2.7E-05	2.1E-11	2.7E-05	4.6E-04	NA	4.8E-04
Acenaphthylene	208-96-8	2.10E+00	1.59E-09	NA	NA	NA	NA	NA	NA	1.0E+00	8.2E-07	1.4E-05	1.1E-11	NA	NA	NA	
Acetophenone	98-86-2	1.70E-01	1.29E-10	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	6.7E-08	1.1E-06	8.6E-13	6.7E-07	1.1E-05	NA	1.2E-05
Anthracene	120-12-7	4.28E+00	3.24E-09	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E+00	1.7E-06	2.9E-05	2.2E-11	5.6E-06	9.5E-05	NA	1.0E-04
Benzaldehyde	100-52-7	4.50E-02	3.41E-11	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	1.8E-08	3.0E-07	2.3E-13	1.8E-07	3.0E-06	NA	3.2E-06
Benzo(a)anthracene	56-55-3	6.99E+00	5.30E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	2.7E-06	6.1E-06	3.5E-11	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	8.61E+00	6.52E-09	NA	NA	NA	7.3E+00	7.3E+00	3.1E+00	1.3E-01	3.4E-06	7.5E-06	4.3E-11	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	9.70E+00	7.34E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	3.8E-06	8.4E-06	4.9E-11	NA	NA	NA	NA
Benzo(g,h,i)perylene	198-55-0	5.82E+00	4.41E-09	NA	NA	NA	NA	NA	NA	1.0E-01	2.3E-06	3.9E-06	2.9E-11	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	7.19E+00	5.45E-09	NA	NA	NA	7.3E-02	7.3E-02	NA	1.3E-01	2.8E-06	6.3E-06	3.6E-11	NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	117-81-7	7.70E-01	5.83E-10	2.0E-02	2.0E-02	NA	1.4E-02	1.4E-02	NA	1.0E+00	3.0E-07	5.2E-06	3.9E-12	1.5E-05	2.6E-04	NA	2.7E-04
Carbazole	86-74-8	4.22E+00	3.20E-09	NA	NA	NA	2.0E-02	2.0E-02	NA	1.0E+00	1.7E-06	2.8E-05	2.1E-11	NA	NA	NA	NA
Dibenz(a,h)anthracene	53-70-3	4.67E+00	3.54E-09	NA	NA	NA	7.3E+00	7.3E+00	NA	1.3E-01	1.8E-06	4.1E-06	2.4E-11	NA	NA	NA	NA
Dibenzofuran	132-64-9	3.20E+00	2.42E-09	NA	NA	NA	NA	NA	NA	1.0E+00	1.3E-06	2.1E-05	1.6E-11	NA	NA	NA	NA
Di-n-butyl phthalate	84-74-2	1.80E-01	1.36E-10	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	7.0E-08	1.2E-06	9.1E-13	7.0E-07	1.2E-05	NA	1.3E-05
Fluoranthene	206-44-0	1.76E+01	1.33E-08	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	6.9E-06	1.2E-04	8.9E-11	1.7E-04	2.9E-03	NA	3.1E-03
Fluorene	86-73-7	3.40E+00	2.58E-09	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	1.3E-06	2.3E-05	1.7E-11	3.3E-05	5.7E-04	NA	6.0E-04
Indeno(1,2,3-c,d)pyrene	193-39-5	6.68E+00	5.06E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	2.6E-06	5.8E-06	3.4E-11	NA	NA	NA	NA
Naphthalene	91-20-3	1.30E+00	9.85E-10	2.0E-02	2.0E-02	9.0E-04	NA	NA	NA	1.0E+00	5.1E-07	8.7E-06	6.6E-12	2.5E-05	4.4E-04	7.3E-09	4.6E-04
Phenanthrene	85-01-8	1.51E+01	1.14E-08	NA	NA	NA	NA	NA	NA	1.0E+00	5.9E-06	1.0E-04	7.6E-11	NA	NA	NA	NA
Phenol	108-95-2	6.66E+00	5.04E-09	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E+00	2.6E-06	4.5E-05	3.4E-11	8.7E-06	1.5E-04	NA	1.6E-04
Pyrene	129-00-0	1.67E+01	1.27E-08	3.0E-02	3.0E-02	NA	NA	NA	NA	1.0E+00	6.5E-06	1.1E-04	8.4E-11	2.2E-04	3.7E-03	NA	3.9E-03
PCB-1248 (Arochlor 1248)	12672-29-6	3.36E+01	2.54E-08	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	1.3E-05	3.1E-05	1.7E-10	NA	NA	NA	NA
PCB-1254 (Arochlor 1254)	11097-69-1	3.86E+01	2.92E-08	2.0E-05	2.0E-05	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	1.5E-05	3.6E-05	1.9E-10	7.5E-01	1.8E+00	NA	2.6E+00
PCB-1260 (Arochlor 1260)	11096-82-5	4.03E+01	3.05E-08	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	1.6E-05	3.8E-05	2.0E-10	NA	NA	NA	NA
Aluminum (fume or dust)	7429-90-5	1.05E+03	7.94E-07	1.0E+00	1.0E+00	NA	NA	NA	NA	1.0E-02	4.1E-04	7.0E-05	5.3E-09	4.1E-04	7.0E-05	NA	4.8E-04
Arsenic	7440-38-2	2.89E+00	2.19E-09	3.0E-04	3.0E-04	NA	1.5E+00	1.5E+00	1.5E+01	3.0E-02	1.1E-06	5.8E-07	1.5E-11	3.8E-03	1.9E-03	NA	5.7E-03
Barium	7440-39-3	5.24E+00	3.97E-09	2.0E-01	2.0E-01	NA	NA	NA	NA	1.0E-02	2.1E-06	3.5E-07	2.6E-11	1.0E-05	1.8E-06	NA	1.2E-05
Calcium	7440-70-2	2.33E+04	1.76E-05	NA	NA	NA	NA	NA	NA	1.0E-02	9.1E-03	1.6E-03	1.2E-07	NA	NA	NA	NA
Chromium, Total	7440-47-3	6.94E+00	5.26E-09	3.0E-03	3.0E-03	NA	NA	NA	4.1E+01	1.0E-02	2.7E-06	4.6E-07	3.5E-11	9.1E-04	1.5E-04	NA	1.1E-03
Cobalt	7440-48-4	1.39E+00	1.05E-09	NA	NA	NA	NA	NA	NA	1.0E-02	5.4E-07	9.3E-08	7.0E-12	NA	NA	NA	NA
Copper	7440-50-8	2.78E+00	2.10E-09	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E-02	1.1E-06	1.9E-07	1.4E-11	2.7E-05	4.6E-06	NA	3.2E-05
Iron	7439-89-6	3.75E+03	2.84E-06	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E-02	1.5E-03	2.5E-04	1.9E-08	4.9E-03	8.4E-04	NA	5.7E-03
Lead	7439-92-1	5.18E+00	3.92E-09	NA	NA	NA	NA	NA	NA	1.0E-02	2.0E-06	3.5E-07	2.6E-11	NA	NA	NA	NA
Magnesium	7439-95-4	1.19E+04	9.04E-06	NA	NA	NA	NA	NA	NA	1.0E-02	4.7E-03	8.0E-04	6.0E-08	NA	NA	NA	NA
Manganese	7439-96-5	1.31E+02	9.90E-08	2.0E-02	2.0E-02	1.4E-05	NA	NA	NA	1.0E-02	5.1E-05	8.7E-06	6.9E-09	2.6E-03	4.4E-04	4.8E-04	3.5E-03
Mercury	7439-97-6	8.51E-03	6.45E-12	NA	NA	8.6E-05	NA	NA	NA	1.0E-02	3.3E-09	5.7E-10	4.5E-13	NA	NA	5.2E-09	5.2E-09
Nickel	7440-02-0	3.10E+00	2.34E-09	2.0E-02	2.0E-02	NA	NA	NA	NA	1.0E-02	1.2E-06	2.1E-07	1.6E-11	6.1E-05	1.0E-05	NA	7.1E-05
Potassium	7440-09-7	1.57E+02	1.19E-07	NA	NA	NA	NA	NA	NA	1.0E-02	6.2E-05	1.1E-05	7.9E-10	NA	NA	NA	NA
Sodium	7440-23-5	1.51E+02	1.14E-07	NA	NA	NA	NA	NA	NA	1.0E-02	5.9E-05	1.0E-05	7.6E-10	NA	NA	NA	NA
Vanadium (fume or dust)	7440-62-2	8.93E+00	6.77E-09	1.0E-03	1.0E-03	NA	NA	NA	NA	1.0E-02	3.5E-06	6.0E-07	4.5E-11	3.5E-03	6.0E-04	NA	4.1E-03
Zinc	7440-66-6	2.08E+01	1.58E-08	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E-02	8.2E-06	1.4E-06	1.1E-10	2.7E-05	4.6E-06	NA	3.2E-05
Hazard Index (Sum of Hazard Quotient):														**0.8**	**2**	**0.0005**	**3**
Total Excess Liftetime Cancer Risk:																	

Note:
NA = Not applicable or not available

TABLE E-9
Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Soil (0–0.5 feet bgs)—Recreational (Adolescent) Scenario
OMC Plant 2

											Noncarcinogenic						
Chemical	CAS	Soil Exposure Point Concentration (mg/kg)	Ambient Air Exposure Point Concentration (µg/m³)	Oral Reference Dose (RfD) (mg/kg-day)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	Oral Slope Factor (SF) (kg-day/mg)	Dermal Slope Factor (SF) (kg-day/mg)	Inhalation Slope Factor (SF) (kg-day/mg)	ABS Unitless	Estimated Ingestion Intake (mg/kg-day)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Ingestion HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Hazard Quotient (Intake/RfD)
Acetone	67-64-1	1.67E-02	1.33E-06	9.0E-01	9.0E-01	NA	NA	NA	NA	1.0E+00	1.2E-08	2.1E-07	1.7E-08	1.4E-08	2.3E-07	NA	2.5E-07
Carbon disulfide	75-15-0	6.00E-03	5.04E-06	1.0E-01	1.0E-01	2.0E-01	NA	NA	NA	1.0E+00	4.4E-09	7.6E-08	6.3E-08	4.4E-08	7.6E-07	3.2E-07	1.1E-06
cis-1,2-Dichloroethylene	156-59-2	6.85E-03	5.19E-12	1.0E-02	1.0E-02	1.0E-02	NA	NA	NA	1.0E+00	5.1E-09	8.7E-08	6.5E-14	5.1E-07	8.7E-06	6.5E-12	9.2E-06
Cyclohexane	110-82-7	6.53E-03	5.99E-06	NA	NA	1.7E+00	NA	NA	NA	1.0E+00	4.8E-09	8.3E-08	7.5E-08	NA	NA	4.4E-08	4.4E-08
Methylene chloride	75-09-2	5.00E-03	2.00E-06	6.0E-02	6.0E-02	3.0E-01	7.5E-03	7.5E-03	1.7E-03	1.0E+00	3.7E-09	6.3E-08	2.5E-08	6.2E-08	1.1E-06	8.4E-08	1.2E-06
Toluene	95-49-8	2.04E-02	5.13E-06	2.0E-02	2.0E-02	NA	NA	NA	NA	1.0E+00	1.5E-08	2.6E-07	6.5E-08	7.6E-07	1.3E-05	NA	1.4E-05
Trichloroethylene	79-01-6	3.09E-02	9.47E-06	3.0E-04	3.0E-04	1.0E-02	4.0E-01	4.0E-01	4.0E-01	1.0E+00	2.3E-08	3.9E-07	1.2E-07	7.6E-05	1.3E-03	1.2E-05	1.4E-03
2-Methylnaphthalene	91-57-6	9.00E-01	6.82E-10	4.0E-03	4.0E-03	NA	NA	NA	NA	1.0E+00	6.7E-07	1.1E-05	8.6E-12	1.7E-04	2.8E-03	NA	3.0E-03
Acenaphthene	83-32-9	4.09E+00	3.10E-09	6.0E-02	6.0E-02	NA	NA	NA	NA	1.0E+00	3.0E-06	5.2E-05	3.9E-11	5.0E-05	8.6E-04	NA	9.1E-04
Acenaphthylene	208-96-8	2.10E+00	1.59E-09	NA	NA	NA	NA	NA	NA	1.0E+00	1.6E-06	2.7E-05	2.0E-11	NA	NA	NA	NA
Acetophenone	98-86-2	1.70E-01	1.29E-10	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	1.3E-07	2.2E-06	1.6E-12	1.3E-06	2.2E-05	NA	2.3E-05
Anthracene	120-12-7	4.28E+00	3.24E-09	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E+00	3.2E-06	5.4E-05	4.1E-11	1.1E-05	1.8E-04	NA	1.9E-04
Benzaldehyde	100-52-7	4.50E-02	3.41E-11	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	3.3E-08	5.7E-07	4.3E-13	3.3E-07	5.7E-06	NA	6.0E-06
Benzo(a)anthracene	56-55-3	6.99E+00	5.30E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	5.2E-06	1.2E-05	6.7E-11	NA	NA	NA	NA
Benzo(a)pyrene	50-32-8	8.61E+00	6.52E-09	NA	NA	NA	7.3E+00	7.3E+00	3.1E+00	1.3E-01	6.4E-06	1.4E-05	8.2E-11	NA	NA	NA	NA
Benzo(b)fluoranthene	205-99-2	9.70E+00	7.34E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	7.2E-06	1.6E-05	9.2E-11	NA	NA	NA	NA
Benzo(g,h,i)perylene	198-55-0	5.82E+00	4.41E-09	NA	NA	NA	NA	NA	NA	1.0E-01	4.3E-06	7.4E-06	5.6E-11	NA	NA	NA	NA
Benzo(k)fluoranthene	207-08-9	7.19E+00	5.45E-09	NA	NA	NA	7.3E-02	7.3E-02	NA	1.3E-01	5.3E-06	1.2E-05	6.9E-11	NA	NA	NA	NA
bis(2-Ethylhexyl) phthalate	117-81-7	7.70E-01	5.83E-10	2.0E-02	2.0E-02	NA	1.4E-02	1.4E-02	NA	1.0E+00	5.7E-07	9.7E-06	7.3E-12	2.9E-05	4.9E-04	NA	5.2E-04
Carbazole	86-74-8	4.22E+00	3.20E-09	NA	NA	NA	2.0E-02	2.0E-02	NA	1.0E+00	3.1E-06	5.3E-05	4.0E-11	NA	NA	NA	NA
Dibenz(a,h)anthracene	53-70-3	4.67E+00	3.54E-09	NA	NA	NA	7.3E+00	7.3E+00	NA	1.3E-01	3.5E-06	7.7E-06	4.5E-11	NA	NA	NA	NA
Dibenzofuran	132-64-9	3.20E+00	2.42E-09	NA	NA	NA	NA	NA	NA	1.0E+00	2.4E-06	4.1E-05	3.1E-11	NA	NA	NA	NA
Di-n-butyl phthalate	84-74-2	1.80E-01	1.36E-10	1.0E-01	1.0E-01	NA	NA	NA	NA	1.0E+00	1.3E-07	2.3E-06	1.7E-12	1.3E-06	2.3E-05	NA	2.4E-05
Fluoranthene	206-44-0	1.76E+01	1.33E-08	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	1.3E-05	2.2E-04	1.7E-10	3.3E-04	5.6E-03	NA	5.9E-03
Fluorene	86-73-7	3.40E+00	2.58E-09	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E+00	2.5E-06	4.3E-05	3.2E-11	6.3E-05	1.1E-03	NA	1.1E-03
Indeno(1,2,3-c,d)pyrene	193-39-5	6.68E+00	5.06E-09	NA	NA	NA	7.3E-01	7.3E-01	NA	1.3E-01	4.9E-06	1.1E-05	6.4E-11	NA	NA	NA	NA
Naphthalene	91-20-3	1.30E+00	9.85E-10	2.0E-02	2.0E-02	9.0E-04	NA	NA	NA	1.0E+00	9.6E-07	1.6E-05	1.2E-11	4.8E-05	8.2E-04	1.4E-08	8.7E-04
Phenanthrene	85-01-8	1.51E+01	1.14E-08	NA	NA	NA	NA	NA	NA	1.0E+00	1.1E-05	1.9E-04	1.4E-10	NA	NA	NA	NA
Phenol	108-95-2	6.66E+00	5.04E-09	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E+00	4.9E-06	8.4E-05	6.3E-11	1.6E-05	2.8E-04	NA	3.0E-04
Pyrene	129-00-0	1.67E+01	1.27E-08	3.0E-02	3.0E-02	NA	NA	NA	NA	1.0E+00	1.2E-05	2.1E-04	1.6E-10	4.1E-04	7.1E-03	NA	7.5E-03
PCB-1248 (Arochlor 1248)	12672-29-6	3.36E+01	2.54E-08	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	2.5E-05	6.0E-05	3.2E-10	NA	NA	NA	NA
PCB-1254 (Arochlor 1254)	11097-69-1	3.86E+01	2.92E-08	2.0E-05	2.0E-05	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	2.9E-05	6.8E-05	3.7E-10	1.4E+00	3.4E+00	NA	4.8E+00
PCB-1260 (Arochlor 1260)	11096-82-5	4.03E+01	3.05E-08	NA	NA	NA	2.0E+00	2.0E+00	2.0E+00	1.4E-01	3.0E-05	7.1E-05	3.8E-10	NA	NA	NA	NA
Aluminum (fume or dust)	7429-90-5	1.05E+03	7.94E-07	1.0E+00	1.0E+00	NA	NA	NA	NA	1.0E-02	7.8E-04	1.3E-04	1.0E-08	7.8E-04	1.3E-04	NA	9.1E-04
Arsenic	7440-38-2	2.89E+00	2.19E-09	3.0E-04	3.0E-04	NA	1.5E+00	1.5E+00	1.5E+01	3.0E-02	2.1E-06	1.1E-06	2.8E-11	7.1E-03	3.7E-03	NA	1.1E-02
Barium	7440-39-3	5.24E+00	3.97E-09	2.0E-01	2.0E-01	NA	NA	NA	NA	1.0E-02	3.9E-06	6.6E-07	5.0E-11	1.9E-05	3.3E-06	NA	2.3E-05
Calcium	7440-70-2	2.33E+04	1.76E-05	NA	NA	NA	NA	NA	NA	1.0E-02	1.7E-02	2.9E-03	2.2E-07	NA	NA	NA	NA
Chromium, Total	7440-47-3	6.94E+00	5.26E-09	3.0E-03	3.0E-03	NA	NA	NA	4.1E+01	1.0E-02	5.1E-06	8.8E-07	6.6E-11	1.7E-03	2.9E-04	NA	2.0E-03
Cobalt	7440-48-4	1.39E+00	1.05E-09	NA	NA	NA	NA	NA	NA	1.0E-02	1.0E-06	1.8E-07	1.3E-11	NA	NA	NA	NA
Copper	7440-50-8	2.78E+00	2.10E-09	4.0E-02	4.0E-02	NA	NA	NA	NA	1.0E-02	2.1E-06	3.5E-07	2.6E-11	5.1E-05	8.8E-06	NA	6.0E-05
Iron	7439-89-6	3.75E+03	2.84E-06	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E-02	2.8E-03	4.7E-04	3.6E-08	9.3E-03	1.6E-03	NA	1.1E-02
Lead	7439-92-1	5.18E+00	3.92E-09	NA	NA	NA	NA	NA	NA	1.0E-02	3.8E-06	6.6E-07	4.9E-11	NA	NA	NA	NA
Magnesium	7439-95-4	1.19E+04	9.04E-06	NA	NA	NA	NA	NA	NA	1.0E-02	8.8E-03	1.5E-03	1.1E-07	NA	NA	NA	NA
Manganese	7439-96-5	1.31E+02	9.90E-08	2.0E-02	2.0E-02	1.4E-05	NA	NA	NA	1.0E-02	9.7E-05	1.7E-05	1.2E-09	4.8E-03	8.3E-04	8.7E-05	5.7E-03
Mercury	7439-97-6	8.51E-03	6.45E-12	NA	NA	8.6E-05	NA	NA	NA	1.0E-02	6.3E-09	1.1E-09	8.1E-14	NA	NA	9.4E-10	NA
Nickel	7440-02-0	3.10E+00	2.34E-09	2.0E-02	2.0E-02	NA	NA	NA	NA	1.0E-02	2.3E-06	3.9E-07	3.0E-11	1.1E-04	2.0E-05	NA	1.3E-04
Potassium	7440-09-7	1.57E+02	1.19E-07	NA	NA	NA	NA	NA	NA	1.0E-02	1.2E-04	2.0E-05	1.5E-09	NA	NA	NA	NA
Sodium	7440-23-5	1.51E+02	1.14E-07	NA	NA	NA	NA	NA	NA	1.0E-02	1.1E-04	1.9E-05	1.4E-09	NA	NA	NA	NA
Vanadium (fume or dust)	7440-62-2	8.93E+00	6.77E-09	1.0E-03	1.0E-03	NA	NA	NA	NA	1.0E-02	6.6E-06	1.1E-06	8.5E-11	6.6E-03	1.1E-03	NA	7.7E-03
Zinc	7440-66-6	2.08E+01	1.58E-08	3.0E-01	3.0E-01	NA	NA	NA	NA	1.0E-02	1.5E-05	2.6E-06	2.0E-10	5.1E-05	8.8E-06	NA	6.0E-05
Hazard Index (Sum of Hazard Quotient):														**1.5**	**3**	**0.00010**	**5**
Total Excess Lifetime Cancer Risk:																	

Note:
NA = Not applicable or not available

TABLE E-10

Calculation of RME Chemical Cancer Risks for Porous and Non-Porous Surfaces—Trespasser Scenario

Summary Statistics for Detected Constituents in Wipe Samples—Trespasser Scenario

OMC Plant 2

Chemical	CAS	Wipe Sample Exposure Point Concentration (µg/100 cm^2)	Dermal Slope Factor (SF) (kg-day/mg)	ABS Unitless	Carcinogenic		
					Estimated Dermal Intake (cm2*mg)/(kg*µg*d)	Dermal ELCR (Intake * SF)	Excess Cancer Risk (Intake * SF)
PCB-1248 (Arochlor 1248)	12672-29-6	9.77E+01	2.0E+00	1.4E-01	8.1E-05	2.3E-05	2.2E-05

Notes:

Wipe sample results provided for combined interior non-porous wipe samples (bare metal) and interior porous wipe samples (painted surfaces, concrete, etc.).

J = Estimated Value

TABLE E-11

Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Groundwater-to-Indoor Air—Residential Scenario

OMC Plant 2

Chemical	CAS	Exposure Point Concentration (µg/L)	Indoor Air Exposure Point Concentration ($\mu g/m^3$)	Inhalation Reference Dose (RfD) (mg/kg-day)	Inhalation Slope Factor (SF) (kg-day/mg)	Noncarcinogenic		Carcinogenic	
						Estimated Inhalation Intake (mg/kg-day)	Hazard Quotient (Intake/RfD)	Estimated Inhalation Intake (mg/kg-day)	Excess Cancer Risk (Intake * SF)
1,1-Dichloroethane	75-34-3	1.25E+00	1.59E-01	1.4E-01	NA	4.3E-05	3.0E-04	1.9E-05	NA
1,1-Dichloroethylene	75-35-4	1.50E+01	1.09E+01	6.0E-02	NA	3.0E-03	5.0E-02	1.3E-03	NA
1,2-Dichloroethane	107-06-2	7.13E-01	1.78E-02	1.4E-03	9.1E-02	4.9E-06	3.5E-03	2.1E-06	1.9E-07
1,3-Dichlorobenzene	541-73-1	8.10E-01	3.92E-02	NA	NA	1.1E-05	NA	4.6E-06	NA
1,4-Dichlorobenzene	106-46-7	1.00E+00	3.74E-02	2.3E-01	2.2E-02	1.0E-05	4.5E-05	4.4E-06	9.7E-08
Benzene	71-43-2	1.28E+00	1.68E-01	8.6E-03	2.7E-02	4.6E-05	5.3E-03	2.0E-05	5.3E-07
Carbon Disulfide	75-15-0	1.40E-01	1.24E-01	2.0E-01	NA	3.4E-05	1.7E-04	1.5E-05	NA
Chloroform	67-66-3	6.70E-01	6.70E-02	1.4E-02	8.1E-02	1.8E-05	1.3E-03	7.9E-06	6.4E-07
cis-1,2-Dichloroethene	156-59-2	1.21E+03	1.08E+02	1.0E-02	NA	3.0E-02	5.2E-04	1.3E-02	NA
Methylcyclohexane	108-87-2	1.40E-01	2.91E-01	2.9E-01	NA	8.0E-05	2.8E-04	3.4E-05	NA
Methylene Chloride	75-09-2	7.75E-01	4.80E-02	3.0E-01	1.6E-03	1.3E-05	1.5E-05	5.6E-06	1.9E-05
Toluene	108-88-3	3.30E-02	4.67E-03	1.4E+00	NA	1.3E-06	9.0E-07	5.5E-07	NA
trans-1,2-Dichloroethene	156-60-5	1.44E+01	3.05E+00	1.7E-02	NA	8.3E-04	4.9E-02	3.6E-04	NA
Trichloroethene	79-01-6	3.27E+02	7.14E+01	1.0E-02	6.0E-03	2.0E-02	2.0E+00	8.4E-03	5.0E-05
Vinyl Chloride	75-01-4	1.59E+02	1.47E+02	2.9E-02	3.1E-02	4.0E-02	1.4E+00	1.7E-02	5.4E-04
Hazard Index (Sum of Hazard Quotient):							**3.5**		
Total Excess Liftetime Cancer Risk:									**6.1E-04**

Notes:

Physical property constants from EPA 2001, Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment—Interim). EPA/540/R/99/005.

NA - Not Applicable.

TABLE E-12

Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Groundwater—Construction Worker Scenario

OMC Plant 2

Chemical	CAS	Groundwater Exposure Point Concentration (µg/L)	Ambient Air Exposure Point Concentration ($\mu g/m^3$)	Dermal Reference Dose (RfD) (mg/kg-day)	Inhalation Reference Dose (RfD) (mg/kg-day)	Dermal Slope Factor (SF) (kg-day/mg)	Inhalation Slope Factor (SF) (kg-day/mg)	Permeability Coefficient (cm/hr)	B (dimensionless)	Lag Time (t) (hr)	t* (hr)	Fraction Absorbed Water (FA) (dimensionless)
1,1-Dichloroethane	75-34-3	9.6E+01	3.3E-03	2.0E-01	1.4E-01	NA	NA	6.7E-03	2.6E-02	3.8E-01	9.2E-01	1.0E+00
1,2-Dichloroethane	107-06-2	8.7E-01	1.4E-05	2.0E-02	1.4E-03	9.1E-02	9.1E-02	4.2E-03	1.6E-02	3.8E-01	9.2E-01	1.0E+00
1,3-Dichlorobenzene	541-73-1	8.1E-01	1.3E-05	NA	NA	NA	NA	7.8E-03	3.2E-02	4.6E-01	1.1E+00	1.0E+00
Benzene	71-43-2	1.9E+00	7.1E-05	4.0E-03	8.6E-03	5.5E-02	2.7E-02	1.5E-02	5.1E-02	2.9E-01	7.0E-01	1.0E+00
Carbon disulfide	75-15-0	2.00E-01	3.26E-05	1.0E-01	2.0E-01	NA	NA	1.7E-02	1.0E-01	3.0E-01	7.2E-01	1.0E+00
Chloroform	67-66-3	5.93E+01	1.92E-03	1.0E-02	1.4E-02	NA	8.1E-02	6.8E-03	2.9E-02	5.0E-01	1.2E+00	1.0E+00
cis-1,2-Dichloroethylene	156-59-2	2.84E+04	8.45E-01	1.0E-02	1.0E-02	NA	NA	7.7E-03	2.9E-02	3.7E-01	8.9E-01	1.0E+00
Methylcyclohexane	108-87-2	1.40E-01	2.81E-04	NA	8.6E-01	NA	NA	4.9E-02	2.0E-01	4.2E-01	1.0E+00	1.0E+00
Toluene	108-88-3	2.18E+01	8.68E-04	8.0E-02	1.4E+00	NA	NA	3.1E-02	1.1E-01	3.5E-01	8.4E-01	1.0E+00
trans-1,2-Dichloroethene	156-60-5	5.89E+01	2.87E-03	2.0E-02	1.7E-02	NA	NA	7.7E-03	2.9E-02	3.7E-01	8.9E-01	1.0E+00
Trichloroethylene	79-01-6	2.03E+02	1.05E-02	6.0E-03	6.0E-03	1.1E-02	6.0E-03	1.2E-02	5.1E-02	5.8E-01	1.4E+00	1.0E+00
Vinyl chloride	75-01-4	4.27E+03	5.81E-01	3.0E-03	2.9E-02	7.2E-01	2E-02	5.6E-03	1.7E-02	2.4E-01	5.7E-01	1.0E+00
Xylenes, Total	1330-20-7	8.70E-01	3.11E-05	2.0E-01	2.9E-02	NA	NA	5.3E-02	2.0E-01	4.2E-01	1.0E+00	1.0E+00
Di-n-butyl phthalate	84-74-2	1.50E+00	NA	1.0E-01	1.0E-01	1.0E-01	1.0E-01	3.5E-03	1.3E-02	3.2E-01	7.6E-01	1.0E+00
4-Methylphenol (p-Cresol)	106-44-5	8.51E+00	NA	5.0E-03	5.0E-03	5.0E-03	5.0E-03	7.8E-03	3.2E-02	4.6E-01	1.1E+00	1.0E+00
PCB-1016 (Arochlor 1016)	12674-11-2	2.97E+00	NA	7.0E-05	7.0E-05	7.0E-05	7.0E-05	NA	NA	NA	NA	NA
PCB-1248 (Arochlor 1248)	12672-29-6	2.57E+01	NA	NA	NA	2.0E+00	NA	NA	NA	NA	NA	NA
Aluminum (Total)	7429-90-5	2.74E+01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (Total)	7440-38-2	3.57E+02	NA	`	NA	3.0E-04	3.0E-04	NA	NA	NA	NA	NA
Chromium (Total)	7440-47-3	5.20E+00	NA	3.0E-03	3.0E-05	3.0E-03	3.0E-03	NA	NA	NA	NA	NA
Cobalt (Total)	7440-48-4	3.90E+00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper (Total)	7440-50-8	6.60E+00	NA	4.0E-02	NA	4.0E-02	4.0E-02	NA	NA	NA	NA	NA
Iron (Total)	7439-89-6	3.51E+04	NA	3.0E-01	NA	3.0E-01	3.0E-01	NA	NA	NA	NA	NA
Magnesium (Total)	7439-95-4	4.73E+04	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	7439-96-5	1.08E+03	NA	2.0E-02	1.4E-05	2.0E-02	2.0E-02	NA	NA	NA	NA	NA
Nickel (Total)	7440-02-0	8.80E+00	NA	2.0E-02	NA	2.0E-02	2.0E-02	NA	NA	NA	NA	NA
Vanadium (Total)	7440-62-2	2.30E+00	NA	1.0E-03	NA	1.0E-03	1.0E-03	NA	NA	NA	NA	NA
Zinc (Total)	7440-66-6	5.93E+01	NA	3.0E-01	NA	3.0E-01	3.0E-01	NA	NA	NA	NA	NA
Hazard Index (Sum of Hazard Quotient):												
Total Excess Liftetime Cancer Risk:												

TABLE E-12 Supplement
Inhalation Exposure Concentrations—Groundwater-to-Outdoor Air—Construction Worker
OMC Plant 2

Chemical	Conc. in Groundwater (µg/L)	Diffusion Coefficient in Air (cm^2/s)	Diffusion Coefficient in Water (cm^2/s)	Henry's Law Constant - H (unitless)	Calculated Deff,vad	Calculated Deff,cap	Calculated Deff,ws	Volatilization Factor (cm^3-water/cm^3-air)	Volatilization Factor (L-water/m^3-air)	Concentration in Air (µg/m^3)
1,1-Dichloroethane	9.60E+01	7.42E-02	1.05E-05	2.30E-01	5.79E-03	1.84E-05	9.45E-04	3.47E-08	3.47E-05	3.33E-03
1,2-Dichloroethane	8.70E-01	1.04E-01	9.90E-06	4.01E-02	8.12E-03	6.14E-05	2.58E-03	1.65E-08	1.65E-05	1.43E-05
1,3-Dichlorobenzene	8.10E-01	6.90E-02	7.90E-06	7.79E-02	5.39E-03	2.86E-05	1.32E-03	1.64E-08	1.64E-05	1.33E-05
Benzene	1.90E+00	8.80E-02	9.80E-06	2.28E-01	6.87E-03	1.97E-05	1.03E-03	3.73E-08	3.73E-05	7.08E-05
Carbon disulfide	2.00E-01	1.04E-01	1.00E-05	1.24E+00	8.12E-03	1.50E-05	8.24E-04	1.63E-07	1.63E-04	3.26E-05
Chloroform	5.93E+01	1.04E-01	1.00E-05	1.50E-01	8.12E-03	2.64E-05	1.35E-03	3.23E-08	3.23E-05	1.92E-03
cis-1,2-Dichloroethylene	2.84E+04	7.36E-02	1.13E-05	1.67E-01	5.74E-03	2.26E-05	1.12E-03	2.98E-08	2.98E-05	8.45E-01
Methylcyclohexane	1.40E-01	9.86E-02	8.50E-06	1.77E+01	7.69E-03	1.28E-05	7.11E-04	2.01E-06	2.01E-03	2.81E-04
Toluene	2.18E+01	8.70E-02	8.60E-06	2.72E-01	6.79E-03	1.74E-05	9.19E-04	3.99E-08	3.99E-05	8.68E-04
trans-1,2-Dichloroethylene	5.89E+01	7.07E-02	1.19E-05	3.85E-01	5.52E-03	1.51E-05	7.93E-04	4.86E-08	4.86E-05	2.87E-03
Trichloroethylene (TCE)	2.03E+02	7.90E-02	9.10E-06	4.22E-01	6.16E-03	1.44E-05	7.70E-04	5.19E-08	5.19E-05	1.05E-02
Vinyl chloride	4.27E+03	1.06E-01	1.23E-06	1.11E+00	8.27E-03	1.39E-05	7.71E-04	1.36E-07	1.36E-04	5.81E-01
Xylenes	8.70E-01	7.00E-02	7.80E-06	3.01E-01	5.46E-03	1.41E-05	7.44E-04	3.57E-08	3.57E-05	3.11E-05

TABLE E-12

Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Groundwater—Construction Worker Scenario

OMC Plant 2

			Noncarcinogenic					Carcinogenic				
Chemical	CAS	Estimated DA_{event} (mg/cm^2-event)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Dermal HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Hazard Quotient (Intake/RfD)	Estimated Dermal Intake (mg/kg-day)	Estimated Inhalation Intake (mg/kg-day)	Dermal ELCR (Intake * SF)	Inhalation ELCR (Intake *SF)	Excess Cancer Risk (Intake * SF)
1,1-Dichloroethane	75-34-3	1.2E-05	3.0E-03	3.9E-07	1.5E-02	2.7E-06	1.5E-02	4.3E-05	5.6E-09	--	--	--
1,2-Dichloroethane	107-06-2	3.2E-08	8.2E-06	1.7E-09	4.1E-04	1.2E-06	4.1E-04	1.2E-07	2.4E-11	1.1E-08	2.2E-12	1.1E-08
1,3-Dichlorobenzene	541-73-1	5.5E-08	1.4E-05	1.6E-09	NA	NA	NA	2.0E-07	2.2E-11	--	--	--
Benzene	71-43-2	2.3E-07	6.0E-05	8.3E-09	1.5E-02	9.7E-07	1.5E-02	8.6E-07	1.2E-10	4.7E-08	3.2E-12	4.7E-08
Carbon disulfide	75-15-0	2.7E-08	7.0E-06	3.8E-09	7.0E-05	1.9E-08	7.0E-05	1.0E-07	5.5E-11	--	--	--
Chloroform	67-66-3	3.6E-06	9.2E-04	2.2E-07	9.2E-02	1.6E-05	9.2E-02	1.3E-05	3.2E-09	--	2.6E-10	2.6E-10
cis-1,2-Dichloroethylene	156-59-2	1.8E-03	4.6E-01	9.9E-05	2.9E+00	9.9E-03	2.9E+00	6.6E-03	1.4E-06	--	--	--
Methylcyclohexane	108-87-2	5.3E-08	1.4E-05	3.3E-08	NA	3.8E-08	3.8E-08	1.9E-07	4.7E-10	--	--	--
Toluene	108-88-3	5.4E-06	1.4E-03	1.0E-07	1.7E-02	7.1E-08	1.7E-02	2.0E-05	1.5E-09	--	--	--
trans-1,2-Dichloroethene	156-60-5	3.9E-06	1.0E-03	3.4E-07	5.0E-02	2.0E-05	5.0E-02	1.4E-05	4.8E-09	--	--	--
Trichloroethylene	79-01-6	2.1E-05	5.4E-03	1.2E-06	9.0E-01	2.1E-04	9.0E-01	7.7E-05	1.8E-08	8.5E-07	1.1E-10	8.5E-07
Vinyl chloride	75-01-4	2.0E-04	5.2E-02	6.8E-05	1.1E+00	2.4E-03	1.1E+00	7.4E-04	9.7E-07	5.3E-04	1.5E-08	5.3E-04
Xylenes, Total	1330-20-7	3.5E-07	9.1E-05	3.6E-09	4.6E-04	1.3E-07	4.6E-04	1.3E-06	5.2E-11	--	--	--
Di-n-butyl phthalate	84-74-2	9.0E-05	2.3E-02	NA	2.3E-01	NA	2.3E-01	3.3E-04	NA	3.3E-05	NA	3.3E-05
4-Methylphenol (p-Cresol)	106-44-5	1.7E-05	4.3E-03	NA	8.7E-01	NA	8.7E-01	6.2E-05	NA	3.1E-07	NA	3.1E-07
PCB-1016 (Arochlor 1016)	12674-11-2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PCB-1248 (Arochlor 1248)	12672-29-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aluminum (Total)	7429-90-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic (Total)	7440-38-2	5.8E-07	1.5E-04	NA	5.0E-01	NA	5.0E-01	2.2E-06	NA	6.5E-10	NA	6.5E-10
Chromium (Total)	7440-47-3	1.2E-06	3.0E-04	NA	1.0E-01	NA	1.0E-01	4.3E-06	NA	1.3E-08	NA	1.3E-08
Cobalt (Total)	7440-48-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper (Total)	7440-50-8	5.8E-07	1.5E-04	NA	3.8E-03	NA	3.8E-03	2.2E-06	NA	8.6E-08	NA	8.6E-08
Iron (Total)	7439-89-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium (Total)	7439-95-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese (Total)	7439-96-5	5.8E-07	1.5E-04	NA	7.5E-03	NA	7.5E-03	2.2E-06	NA	4.3E-08	NA	4.3E-08
Nickel (Total)	7440-02-0	1.2E-07	3.0E-05	NA	1.5E-03	NA	1.5E-03	4.3E-07	NA	8.6E-09	NA	8.6E-09
Vanadium (Total)	7440-62-2	5.8E-07	1.5E-04	NA	1.5E-01	NA	1.5E-01	2.2E-06	NA	2.2E-09	NA	2.2E-09
Zinc (Total)	7440-66-6	3.5E-07	9.0E-05	NA	3.0E-04	NA	3.0E-04	1.3E-06	NA	3.9E-07	NA	3.9E-07
Hazard Index (Sum of Hazard Quotient):					**6.9**	**0.01**	**6.9**					
Total Excess Liftetime Cancer Risk:										**5.7E-04**	**1.5E-08**	**5.7E-04**

Notes:

Physical property constants from EPA 2004, Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment—Final). EPA/540/R/99/005.

NA - not applicable.

TABLE E-13

Calculation of RME Chemical Cancer Risks and Non-Cancer Hazards for Groundwater-to-Outdoor Air—Residential Scenario

OMC Plant 2

					Noncarcinogenic				Carcinogenic	
Chemical	**CAS**	**Ambient Air Exposure Point Concentration ($\mu g/m^3$)**	**Inhalation Reference Dose (RfD) (mg/kg-day)**	**Inhalation Slope Factor (SF) (kg-day/mg)**	**Noncarcinogenic Intake—Adult (mg/kg-day)**	**Noncarcinogenic Intake—Child (mg/kg-day)**	**Noncancer Hazard Quotient (HQ)—Adult (mg/kg-day)**	**Noncancer Hazard Quotient (HQ)—Child (mg/kg-day)**	**Carcinogenic Intake—Adult, Child Combined (mg/kg-day) Inhalation**	**Increased Lifetime Cancer Risk—Combined Adult and Child Inhalation**
1,1-Dichloroethane	75-34-3	2.27E-05	1.4E-01	NA	3.4E-10	9.4E-10	2.4E-09	6.6E-09	--	--
1,1-Dichloroethylene	75-35-4	9.91E-04	6.0E-02	NA	1.5E-08	4.1E-08	2.4E-07	6.9E-07	--	--
1,2-Dichloroethane	107-06-2	6.17E-06	1.4E-03	9.1E-02	9.1E-11	2.6E-10	6.5E-08	1.8E-07	5.3E-11	4.8E-12
1,3-Dichlorobenzene	541-73-1	6.98E-06	--	--	--	2.9E-10	--	--	--	--
1,4-Dichlorobenzene	106-46-7	9.72E-06	2.3E-01	2.2E-02	--	4.0E-10	6.3E-10	--	8.4E-11	1.8E-12
Benzene	71-43-2	2.51E-05	8.6E-03	2.7E-02	3.7E-10	1.0E-09	4.3E-08	1.2E-07	2.2E-10	5.8E-12
Carbon disulfide	75-15-0	1.20E-05	2.0E-01	--	1.8E-10	5.0E-10	8.9E-10	2.5E-09	--	--
Chloroform	67-66-3	1.13E-05	1.4E-02	8.1E-02	1.7E-10	4.7E-10	1.2E-08	3.4E-08	9.8E-11	7.9E-12
cis-1,2-Dichloroethylene	156-59-2	1.88E-02	1.0E-02	--	2.8E-07	7.8E-07	2.8E-05	7.8E-05	--	--
Methylcyclohexane	108-87-2	1.47E-04	2.9E-01	--	2.2E-09	6.1E-09	7.5E-09	2.1E-08	--	--
Methylene chloride	75-09-2	1.05E-05	3.0E-01	1.6E-03	1.6E-10	4.4E-10	5.2E-10	5.1E-10	9.1E-11	1.5E-13
Toluene	108-88-3	6.90E-07	1.4E+00	--	1.0E-11	2.9E-11	7.1E-12	2.0E-11	--	--
trans-1,2-Dichloroethylene	156-60-5	3.68E-04	1.7E-02	--	5.4E-09	1.5E-08	3.2E-07	9.0E-07	--	--
Trichloroethylene (TCE)	79-01-6	8.89E-03	1.0E-02	6.0E-03	1.3E-07	3.7E-07	1.3E-05	3.7E-05	7.7E-08	4.6E-10
Vinyl chloride	75-01-4	9.15E-05	2.9E-02	3.1E-02	1.4E-09	3.8E-09	4.7E-08	1.3E-07	7.9E-10	2.4E-11
Hazard Index (Sum of Hazard Quotient):							**0.00004**	**0.0001**		
Total Excess Liftetime Cancer Risk:										**5.1E-10**

-- Not Applicable

TABLE E-14
Calculation of RME Chemical Cancer Risks and Noncancer Hazards for Groundwater—Residential Scenario
OMC Plant 2

							Carcinogenic Intake (mg/kg-day)—Lifetime			Increased Lifetime Cancer Risk			
Chemical	CAS	Concentration in Groundwater (µg/L)	Oral Slope Factor (mg/kg/day)	Inhalation Slope Factor (mg/kg/day)	Permeability Contestant (cm/hr)	GI ABS Factor (unitless)	Ingestion Intake (mg/kg/day)	Inhalation Intake (mg/kg/day)	Dermal Intake (mg/kg/day)	Ingestion ELCR (Intake x SF)	Inhalation ELCR (Intake x SF)	Dermal ELCR (Intake x SF)	Total Excess Cancer Risk
cis-1,2-Dichloroethylene	156-59-2	1.2E+03	NA	NA	7.7E-03	1.0E+00							
Trichloroethylene	79-01-6	3.3E+02	4.0E-01	4.0E-01	1.2E-02	1.0E+00	4.9E-03	3.3E-04	1.3E-04	2.0E-03	1.3E-04	5.0E-05	2.1E-03
1,1-Dichloroethane	75-34-3	1.2E+00	NA	NA	6.7E-03	1.0E+00							
Benzene	71-43-2	1.3E+00	5.5E-02	2.7E-02	1.5E-02	1.0E+00	1.9E-05	1.3E-06	6.2E-07	1.0E-06	3.6E-08	3.4E-08	1.1E-06
trans-1,2-Dichloroethene	156-60-5	1.4E+01	NA	NA	7.7E-03	1.0E+00							
Vinyl chloride	75-01-4	1.6E+02	1.5E+00	1.5E-02	5.6E-03	1.0E+00	2.4E-03	1.6E-04	2.9E-05	3.5E-03	2.5E-06	4.4E-05	3.6E-03
1,1-Dichloroethylene	75-35-4	1.5E+01	NA	NA	1.2E-02	1.0E+00							
1,2-Dichloroethane	107-06-2	7.1E-01	9.1E-02	9.1E-02	4.2E-03	1.0E+00	1.1E-05	7.3E-07	9.8E-08	9.7E-07	6.6E-08	8.9E-09	1.0E-06
Carbon disulfide	75-15-0	1.4E-01	NA	NA	1.7E-02	1.0E+00							
Chloroform	67-66-3	6.7E-01	6.1E-03	8.1E-02	6.8E-03	1.0E+00	1.0E-05	6.8E-07	1.5E-07	6.1E-08	5.5E-08	9.1E-10	1.2E-07
Methylcyclohexane	108-87-2	1.4E-01	NA	NA	4.9E-02	1.0E+00	2.1E-06		2.2E-07				
1,4-Dichlorobenzene	106-46-7	1.0E+00	2.4E-02	2.2E-02	4.2E-02	1.0E+00	1.5E-05	1.0E-06	1.4E-06	3.6E-07	2.2E-08	3.3E-08	4.1E-07
Dichloromethane	75-09-2	7.7E-01	7.5E-03	1.7E-03	3.5E-03	1.0E+00	1.2E-05	7.9E-07	8.9E-08	8.6E-08	1.3E-09	6.7E-10	8.8E-08
m-Dichlorobenzene	541-73-1	8.1E-01	NA	NA	4.1E-02	1.0E+00							
Toluene	95-49-8	3.3E-02	NA	NA	3.1E-02	1.0E+00							
di-n-Butyl phthalate	84-74-2	1.5E+00	NA	NA	3.5E-03	1.0E+00							
2,4-DimethylphenolL	105-67-9	2.6E+00	NA	NA	1.1E-02	1.0E+00							
4-Methylphenol (p-Cresol)	106-44-5	4.4E+00	NA	NA	7.8E-03	1.0E+00							
PCB-1016 (Arochlor 1016)	12674-11-2	1.2E-01	7.0E-02	7.0E-02	1.0E-03	1.4E-01	1.8E-06		3.9E-09	1.2E-07		1.9E-09	1.2E-07
PCB-1248 (Arochlor 1248)	12672-29-6	4.8E+01	2.0E+00	2.0E+00	1.0E-03	1.4E-01	7.1E-04		1.6E-06	1.4E-03		2.2E-05	1.4E-03
Manganese (total)	7439-96-5	4.5E+02	NA	NA	1.0E-03	1.0E-02							
Iron (total)	7439-89-6	3.0E+03	NA	NA	1.0E-03	1.0E-02							
Zinc (total)	7440-66-6	1.1E+01	NA	NA	6.0E-04	1.0E-02							
Arsenic (total)	7440-38-2	3.3E+02	1.5E+00	NA	1.0E-03	1.0E-02	4.9E-03		1.1E-05	7.4E-03		1.6E-03	9.0E-03
Nickel (total)	7440-02-0	6.9E+00	NA	NA	2.0E-04	1.0E-02							
Vanadium (total)	7440-62-2	1.7E+00	NA	NA	1.0E-03	1.0E-02							
Copper (total)	7440-50-8	6.6E+00	NA	NA	1.0E-03	1.0E-02							
Aluminum (total)	7429-90-5	2.2E+01	NA	NA	1.0E-03	1.0E-02							
Cobalt (total)	7440-48-4	1.2E+00	NA	NA	1.0E-03	1.0E-02							
Cyanide	57-12-5	8.4E+00	NA	NA	1.0E-03	1.0E-02							
Hazard Index (Sum of Hazard Quotient):													
Total Excess Lifetime Cancer Risk:										**1.4E-02**	**1.4E-04**	**1.7E-03**	**1.6E-02**

TABLE E-14

Calculation of RME Chemical Cancer Risks and Noncancer Hazards for Groundwater—Residential Scenario

OMC Plant 2

Chemical	CAS	Concentration in Groundwater (µg/L)	Oral Reference Dose (RfD) (mg/kg/day)	Inhalation Reference Dose (RfD) (mg/kg/day)	Permeability Contestant (cm/hr)	GI ABS Factor (unitless)	Noncarcinogenic Intake—Child (mg/kg-day)			Noncancer Hazard Quotient (HQ)—Child			
							Ingestion Intake (mg/kg/day)	Inhalation Intake (mg/kg/day)	Dermal Intake (mg/kg/day)	Ingestion HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Total HQ
cis-1,2-Dichloroethylene	156-59-2	1.2E+03	1.0E-02	1.0E-02	7.7E-03	1.0E+00	7.7E-02	7.7E-03	1.1E-03	7.7E+00	7.7E-01	1.1E-01	8.6E+00
Trichloroethylene	79-01-6	3.3E+02	3.0E-04	1.0E-02	1.2E-02	1.0E+00	2.1E-02	2.1E-03	4.5E-04	7.0E+01	2.1E-01	1.5E+00	7.2E+01
1,1-Dichloroethane	75-34-3	1.2E+00	1.0E-01	1.4E-01	6.7E-03	1.0E+00	8.0E-05	8.0E-06	9.8E-07	8.0E-04	5.6E-05	9.8E-06	8.6E-04
Benzene	71-43-2	1.3E+00	4.0E-03	8.6E-03	1.5E-02	1.0E+00	8.2E-05	8.2E-06	2.2E-06	2.1E-02	9.5E-04	5.5E-04	2.2E-02
trans-1,2-Dichloroethene	156-60-5	1.4E+01	2.0E-02	1.7E-02	7.7E-03	1.0E+00	9.2E-04	9.2E-05	1.3E-05	4.6E-02	5.4E-03	6.5E-04	5.2E-02
Vinyl chloride	75-01-4	1.6E+02	3.0E-03	2.9E-02	5.6E-03	1.0E+00	1.0E-02	1.0E-03	1.0E-04	3.4E+00	3.5E-02	3.4E-02	3.5E+00
1,1-Dichloroethylene	75-35-4	1.5E+01	5.0E-02	1.4E-01	1.2E-02	1.0E+00	9.6E-04	9.6E-05	2.1E-05	1.9E-02	6.7E-04	4.2E-04	2.0E-02
1,2-Dichloroethane	107-06-2	7.1E-01	2.0E-02	1.4E-03	4.2E-03	1.0E+00	4.6E-05	4.6E-06	3.5E-07	2.3E-03	3.3E-03	1.7E-05	5.6E-03
Carbon disulfide	75-15-0	1.4E-01	1.0E-01	2.0E-01	1.7E-02	1.0E+00	8.9E-06	8.9E-07	2.8E-07	8.9E-05	4.5E-06	2.8E-06	9.7E-05
Chloroform	67-66-3	6.7E-01	1.0E-02	1.4E-02	6.8E-03	1.0E+00	4.3E-05	4.3E-06	5.3E-07	4.3E-03	3.1E-04	5.3E-05	4.6E-03
Methylcyclohexane	108-87-2	1.4E-01	8.6E-01	8.6E-01	4.9E-02	1.0E+00	8.9E-06	8.9E-07	8.0E-07	1.0E-05	1.0E-06	9.3E-07	1.2E-05
1,4-Dichlorobenzene	106-46-7	1.0E+00	3.0E-02	2.3E-01	4.2E-02	1.0E+00	6.4E-05	6.4E-06	4.9E-06	2.1E-03	2.8E-05	1.6E-04	2.3E-03
Dichloromethane	75-09-2	7.7E-01	6.0E-02	3.0E-01	3.5E-03	1.0E+00	5.0E-05	5.0E-06	3.2E-07	8.3E-04	1.7E-05	5.3E-06	8.5E-04
m-Dichlorobenzene	541-73-1	8.1E-01	3.0E-02	3.0E-02	4.1E-02	1.0E+00	5.2E-05	5.2E-06	3.9E-06	1.7E-03	1.7E-04	1.3E-04	2.0E-03
Toluene	95-49-8	3.3E-02	2.0E-02	1.4E+00	3.1E-02	1.0E+00	5.2E-05	5.2E-06	3.9E-06	1.1E-04	1.5E-07	6.0E-06	1.1E-04
di-n-Butyl phthalate	84-74-2	1.5E+00	1.0E-01	NA	3.5E-03	1.0E+00	9.6E-05		6.2E-07	9.6E-04		6.2E-06	9.7E-04
2,4-DimethylphenolL	105-67-9	2.6E+00	2.0E-02	2.0E-02	1.1E-02	1.0E+00	1.6E-04		3.3E-06	8.2E-03		1.7E-04	8.4E-03
4-Methylphenol (p-Cresol)	106-44-5	4.4E+00	5.0E-03	5.0E-03	7.8E-03	1.0E+00	2.8E-04		4.0E-06	5.6E-02		8.0E-04	5.7E-02
PCB-1016 (Arochlor 1016)	12674-11-2	1.2E-01	7.0E-05	7.0E-05	1.0E-03	1.4E-01	7.5E-06		1.4E-08	1.1E-01		1.4E-03	1.1E-01
PCB-1248 (Arochlor 1248)	12672-29-6	4.8E+01	2.0E-05	2.0E-05	1.0E-03	1.4E-01	3.1E-03		5.6E-06	1.5E+02		2.0E+00	1.5E+02
Manganese (total)	7439-96-5	4.5E+02	2.0E-02	NA	1.0E-03	1.0E-02	2.9E-02		5.2E-05	1.4E+00		2.6E-01	1.7E+00
Iron (total)	7439-89-6	3.0E+03	3.0E-01	NA	1.0E-03	1.0E-02	1.9E-01		3.4E-04	6.3E-01		1.1E-01	7.5E-01
Zinc (total)	7440-66-6	1.1E+01	3.0E-01	NA	6.0E-04	1.0E-02	7.3E-04		8.0E-07	2.4E-03		2.7E-04	2.7E-03
Arsenic (total)	7440-38-2	3.3E+02	3.0E-04	NA	1.0E-03	1.0E-02	2.1E-02		3.9E-05	7.1E+01		1.3E+01	8.4E+01
Nickel (total)	7440-02-0	6.9E+00	2.0E-02	NA	2.0E-04	1.0E-02	4.4E-04		1.6E-07	2.2E-02		8.0E-04	2.3E-02
Vanadium (total)	7440-62-2	1.7E+00	1.0E-03	NA	1.0E-03	1.0E-02	1.1E-04		2.0E-07	1.1E-01		2.0E-02	1.3E-01
Copper (total)	7440-50-8	6.6E+00	4.0E-02	NA	1.0E-03	1.0E-02	4.2E-04		7.7E-07	1.1E-02		1.9E-03	1.2E-02
Aluminum (total)	7429-90-5	2.2E+01	1.0E+00	NA	1.0E-03	1.0E-02	1.4E-03		2.6E-06	1.4E-03		2.6E-04	1.7E-03
Cobalt (total)	7440-48-4	1.2E+00	2.0E-02	NA	1.0E-03	1.0E-02	7.7E-05		1.4E-07	3.8E-03		7.0E-04	4.5E-03
Cyanide	57-12-5	8.4E+00	2.0E-02	NA	1.0E-03	1.0E-02	5.3E-04		9.7E-07	2.7E-02		4.9E-03	3.2E-02
Hazard Index (Sum of Hazard Quotient):										**307**	**1**	**17**	**325**
Total Excess Lifetime Cancer Risk:													

TABLE E-14
Calculation of RME Chemical Cancer Risks and Noncancer Hazards for Groundwater—Residential Scenario
OMC Plant 2

Chemical	CAS	Concentration in Groundwater (µg/L)	Oral Reference Dose (RfD) (mg/kg/day)	Inhalation Reference Dose (RfD) (mg/kg/day)	Permeability Contestant (cm/hr)	GI ABS Factor (unitless)	Noncarcinogenic Intake (mg/kg-day)—Adult			Noncancer Hazard Quotient (HQ)—Residential Adult			
							Ingestion Intake (mg/kg/day)	Inhalation Intake (mg/kg/day)	Dermal Intake (mg/kg/day)	Ingestion HQ (Intake/RfD)	Inhalation HQ (Intake/RfD)	Dermal HQ (Intake/RfD)	Total HQ
cis-1,2-Dichloroethylene	156-59-2	1.2E+03	1.0E-02	1.0E-02	7.7E-03	1.0E+00	3.31E-02	1.65E-03	6.18E-04	3.3E+00	1.7E-01	6.2E-02	3.5E+00
Trichloroethylene	79-01-6	3.3E+02	3.0E-04	1.0E-02	1.2E-02	1.0E+00	9.01E-03	4.50E-04	2.54E-04	3.0E+01	4.5E-02	8.5E-01	3.1E+01
1,1-Dichloroethane	75-34-3	1.2E+00	1.0E-01	1.4E-01	6.7E-03	1.0E+00	3.42E-05	1.71E-06	5.59E-07	3.4E-04	1.2E-05	5.6E-06	3.6E-04
Benzene	71-43-2	1.3E+00	4.0E-03	8.6E-03	1.5E-02	1.0E+00	3.52E-05	1.76E-06	1.27E-06	8.8E-03	2.0E-04	3.2E-04	9.3E-03
trans-1,2-Dichloroethene	156-60-5	1.4E+01	2.0E-02	1.7E-02	7.7E-03	1.0E+00	3.95E-04	1.97E-05	7.39E-06	2.0E-02	1.2E-03	3.7E-04	2.1E-02
Vinyl chloride	75-01-4	1.6E+02	3.0E-03	2.9E-02	5.6E-03	1.0E+00	4.35E-03	2.17E-04	5.90E-05	1.4E+00	7.6E-03	2.0E-02	1.5E+00
1,1-Dichloroethylene	75-35-4	1.5E+01	5.0E-02	1.4E-01	1.2E-02	1.0E+00	4.11E-04	2.05E-05	1.20E-05	8.2E-03	1.4E-04	2.4E-04	8.6E-03
1,2-Dichloroethane	107-06-2	7.1E-01	2.0E-02	1.4E-03	4.2E-03	1.0E+00	1.95E-05	9.77E-07	1.99E-07	9.8E-04	7.0E-04	9.9E-06	1.7E-03
Carbon disulfide	75-15-0	1.4E-01	1.0E-01	2.0E-01	1.7E-02	1.0E+00	3.84E-06	1.92E-07	1.58E-07	3.8E-05	9.6E-07	1.6E-06	4.1E-05
Chloroform	67-66-3	6.7E-01	1.0E-02	1.4E-02	6.8E-03	1.0E+00	1.84E-05	9.18E-07	3.04E-07	1.8E-03	6.6E-05	3.0E-05	1.9E-03
Methylcyclohexane	108-87-2	1.4E-01	8.6E-01	8.6E-01	4.9E-02	1.0E+00	3.84E-06	1.92E-07	4.56E-07	4.5E-06	2.2E-07	5.3E-07	5.2E-06
1,4-Dichlorobenzene	106-46-7	1.0E+00	3.0E-02	2.3E-01	4.2E-02	1.0E+00	2.74E-05	1.37E-06	2.79E-06	9.1E-04	6.0E-06	9.3E-05	1.0E-03
Dichloromethane	75-09-2	7.7E-01	6.0E-02	3.0E-01	3.5E-03	1.0E+00	2.12E-05	1.06E-06	1.80E-07	3.5E-04	3.5E-06	3.0E-06	3.6E-04
m-Dichlorobenzene	541-73-1	8.1E-01	3.0E-02	3.0E-02	4.1E-02	1.0E+00	2.22E-05	1.11E-06	2.21E-06	7.4E-04	3.7E-05	7.4E-05	8.5E-04
Toluene	95-49-8	3.3E-02	2.0E-02	1.4E+00	3.1E-02	1.0E+00	9.04E-07	4.52E-08	6.80E-08	4.5E-05	3.2E-08	3.4E-06	4.9E-05
di-n-Butyl phthalate	84-74-2	1.5E+00	1.0E-01	NA	3.5E-03	1.0E+00	4.11E-05		3.53E-07	4.1E-04		3.5E-06	4.1E-04
2,4-DimethylphenolL	105-67-9	2.6E+00	2.0E-02	2.0E-02	1.1E-02	1.0E+00	7.07E-05	3.53E-06	1.88E-06	3.5E-03		9.4E-05	3.6E-03
4-Methylphenol (p-Cresol)	106-44-5	4.4E+00	5.0E-03	5.0E-03	7.8E-03	1.0E+00	1.20E-04	6.00E-06	2.27E-06	2.4E-02		4.5E-04	2.4E-02
PCB-1016 (Arochlor 1016)	12674-11-2	1.2E-01	7.0E-05	7.0E-05	1.0E-03	1.4E-01	3.23E-06	1.61E-07	7.83E-09	4.6E-02		8.0E-04	4.7E-02
PCB-1248 (Arochlor 1248)	12672-29-6	4.8E+01	2.0E-05	2.0E-05	1.0E-03	1.4E-01	1.31E-03		3.17E-06	6.5E+01		1.1E+00	6.7E+01
Manganese (total)	7439-96-5	4.5E+02	2.0E-02	NA	1.0E-03	1.0E-02	1.23E-02		2.99E-05	6.2E-01		1.5E-01	7.7E-01
Iron (total)	7439-89-6	3.0E+03	3.0E-01	NA	1.0E-03	1.0E-02	8.12E-02		1.97E-04	2.7E-01		6.6E-02	3.4E-01
Zinc (total)	7440-66-6	1.1E+01	3.0E-01	NA	6.0E-04	1.0E-02	3.12E-04		4.54E-07	1.0E-03		1.5E-04	1.2E-03
Arsenic (total)	7440-38-2	3.3E+02	3.0E-04	NA	1.0E-03	1.0E-02	9.09E-03		2.21E-05	3.0E+01		7.4E+00	3.8E+01
Nickel (total)	7440-02-0	6.9E+00	2.0E-02	NA	2.0E-04	1.0E-02	1.89E-04		9.17E-08	9.5E-03		4.6E-04	9.9E-03
Vanadium (total)	7440-62-2	1.7E+00	1.0E-03	NA	1.0E-03	1.0E-02	4.66E-05		1.13E-07	4.7E-02		1.1E-02	5.8E-02
Copper (total)	7440-50-8	6.6E+00	4.0E-02	NA	1.0E-03	1.0E-02	1.81E-04		4.38E-07	4.5E-03		1.1E-03	5.6E-03
Aluminum (total)	7429-90-5	2.2E+01	1.0E+00	NA	1.0E-03	1.0E-02	6.05E-04		1.47E-06	6.1E-04		1.5E-04	7.5E-04
Cobalt (total)	7440-48-4	1.2E+00	2.0E-02	NA	1.0E-03	1.0E-02	3.29E-05		7.97E-08	1.6E-03		4.0E-04	2.0E-03
Cyanide	57-12-5	8.4E+00	2.0E-02	NA	1.0E-03	1.0E-02	2.29E-04		5.55E-07	1.1E-02		2.8E-03	1.4E-02
Hazard Index (Sum of Hazard Quotient):										**132**	**0.2**	**10**	**141**
Total Excess Liftetime Cancer Risk:													

Attachment 1

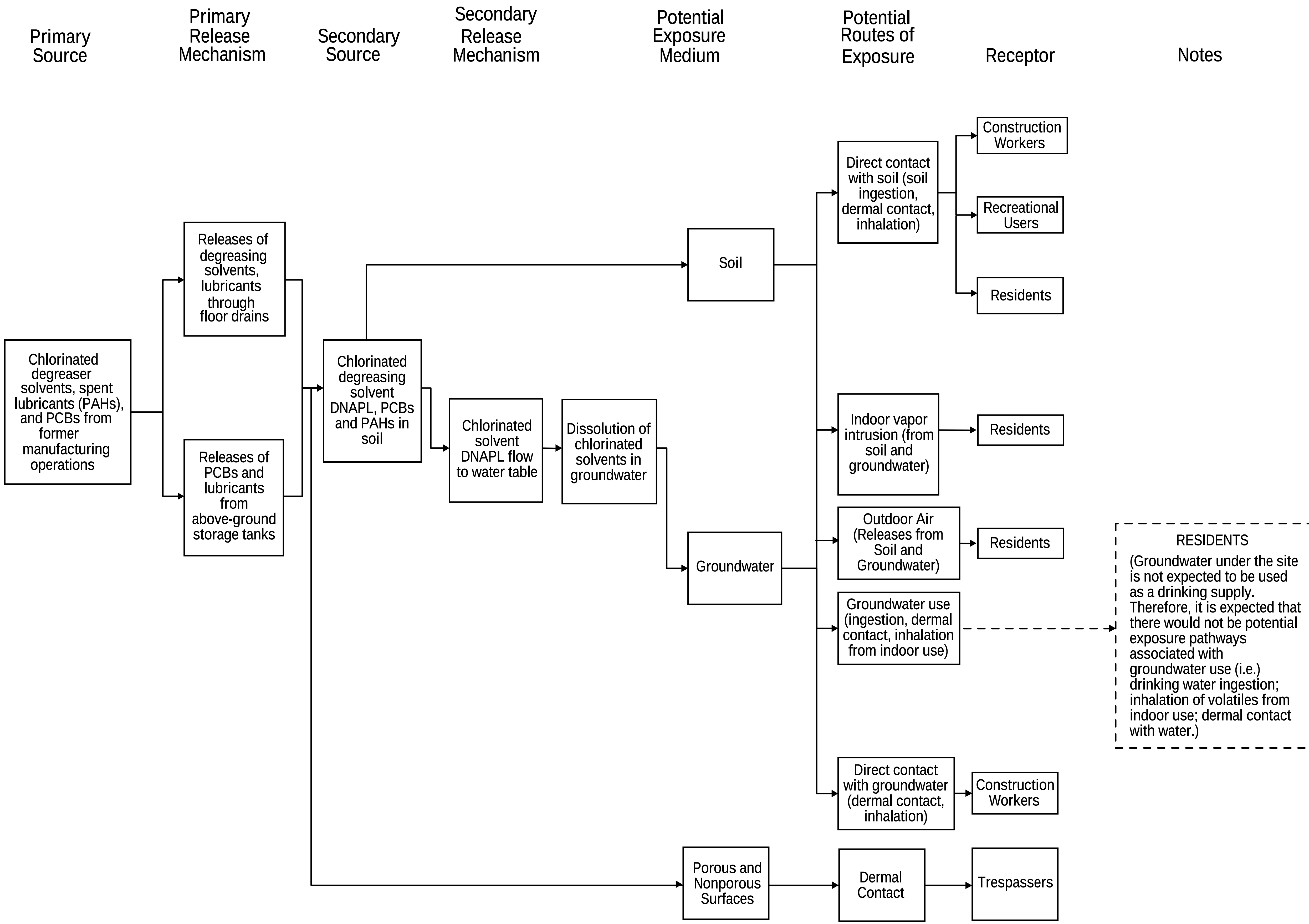

Figure 5-1
Conceptual Model of Potential Exposure Pathways
OMC Plant 2

OMC, Waukegan, Illinois
Summary Statistics
Construction Worker Soil @ 0-4 feet

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]	Partition
PCB-1248 (AROCHLOR 1248)	Soil	59	43	16	16	480000	480000	0.7288	10383.78814	62476.25556	91313.23725	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		91313.23725 (ProUCL)	Const. Soil 0-4'
PCB-1254 (AROCHLOR 1254)	Soil	59	34	8.2	8.2	190000	190000	0.5763	4361.8	24872.66278	36580.93476	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		36580.93476 (ProUCL)	Const. Soil 0-4'
PCB-1260 (AROCHLOR 1260)	Soil	59	30	16.5	26	210000	210000	0.5085	3787.483051	27316.90565	25996.93288	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		25996.93288 (ProUCL)	Const. Soil 0-4'
1,2-BENZPHENANTHRACENE	Soil	59	42	36	36	63000	63000	0.7119	3481.423729	10659.57788	12147.97488	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		12147.97488 (ProUCL)	Const. Soil 0-4'
PYRENE	Soil	59	42	54	54	140000	140000	0.7119	5775.355932	19309.38228	21474.45313	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		21474.45313 (ProUCL)	Const. Soil 0-4'
FLUORANTHENE	Soil	58	40	41	41	150000	150000	0.6897	6605.844828	21484.17628	24223.05007	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		24223.05007 (ProUCL)	Const. Soil 0-4'
BENZO(A)PYRENE	Soil	58	38	48	48	40000	40000	66%	2236.517241	6056.783517	7203.130665	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		7203.130665 (ProUCL)	Const. Soil 0-4'
BENZO(A)ANTHRACENE	Soil	58	37	48	48	47000	47000	64%	2358.5	6739.937045	7885.305063	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		7885.305063 (ProUCL)	Const. Soil 0-4'
BENZO(B)FLUORANTHENE	Soil	58	37	40	40	51000	51000	64%	2618.827586	7788.396428	9005.37816	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		9005.37816 (ProUCL)	Const. Soil 0-4'
INDENO(1,2,3-C,D)PYRENE	Soil	58	37	38	38	27000	27000	64%	1780.87931	4841.494738	5750.945715	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5750.945715 (ProUCL)	Const. Soil 0-4'
BENZO(G,H,I)PERYLENE	Soil	58	35	36	36	32000	32000	60%	1681.172414	4671.265861	5511.649707	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5511.649707 (ProUCL)	Const. Soil 0-4'
PHENANTHRENE	Soil	59	35	1	66	200000	200000	59%	6610.948276	27079.81055	28816.62068	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		28816.62068 (ProUCL)	Const. Soil 0-4'
BENZO(K)FLUORANTHENE	Soil	58	33	45	45	29000	29000	57%	1940.87931	4694.328766	5790.26838	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5790.26838 (ProUCL)	Const. Soil 0-4'
ANTHRACENE	Soil	58	28	17	17	17000	17000	48%	1237.948276	2854.55424	3578.706761	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3578.706761 (ProUCL)	Const. Soil 0-4'
DIBENZ(A,H)ANTHRACENE	Soil	58	27	39	39	13000	13000	47%	1064.448276	2479.583243	3097.727389	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3097.727389 (ProUCL)	Const. Soil 0-4'
CARBAZOLE	Soil	58	24	39	39	17000	17000	41%	978.4827586	2522.895074	3047.277937	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3047.277937 (ProUCL)	Const. Soil 0-4'
BIS(2-ETHYLHEXYL) PHTHALAT	Soil	58	21	36	36	5500	3100	36%	694.2413793	1339.324814	1792.498991	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		1792.498991 (ProUCL)	Const. Soil 0-4'
ACENAPHTHENE	Soil	58	20	42	42	19000	19000	34%	860.0517241	2651.711102	3034.47713	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3034.47713 (ProUCL)	Const. Soil 0-4'
FLUORENE	Soil	58	20	42	42	17000	17000	34%	906.362069	2438.028069	2905.565591	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		2905.565591 (ProUCL)	Const. Soil 0-4'
DIBENZOFURAN	Soil	58	17	46	46	16000	16000	29%	749.362069	2268.238676	2609.33686	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		2609.33686 (ProUCL)	Const. Soil 0-4'
NAPHTHALENE	Soil	58	13	62	62	5100	5100	22%	557.0172414	1243.664696	1268.83056	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		1268.83056 (ProUCL)	Const. Soil 0-4'
2-METHYLNAPHTHALENE	Soil	58	10	43	43	5000	3000	17%	539.1206897	1143.35941	1193.52413	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		1193.52413 (ProUCL)	Const. Soil 0-4'
DI-N-BUTYL PHTHALATE	Soil	52	10	43	43	850	390	19%	183.3269231	110.6970289	250.2400142	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	V. High DLs (1000-5000) removed [2]	250.2400142 (ProUCL)	Const. Soil 0-4'
ACETOPHENONE	Soil	50	7	49	49	230	130	14%	170.6	41.90854961	180.5365193	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed [2]	130 (Max Detected)	Const. Soil 0-4'
ACENAPHTHYLENE	Soil	51	4	15	15	530	530	8%	196.1372549	74.34487732	213.5840353	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed [2]	213.5840353 (ProUCL)	Const. Soil 0-4'
CAPROLACTAM	Soil	50	4	41	41	230	210	8%	182	35.0457427	190.0355367	ug/Kg	95% Modified-t UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed [2]	190.0355367 (ProUCL)	Const. Soil 0-4'
PHENOL	Soil	58	4	39	39	20000	20000	7%	971.7931034	2820.229708	3284.405183	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3284.405183 (ProUCL)	Const. Soil 0-4'
TRICHLOROETHYLENE	Soil	66	29	2	2	100000	100000	44%	2198.227273	12759.33723	17825.16011	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		17825.16011 (ProUCL)	Const. Soil 0-4'
DICHLOROMETHANE	Soil	66	17	2	2	330	330	26%	10.54545455	39.96187869	31.98673561	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		31.98673561 (ProUCL)	Const. Soil 0-4'
CIS-1,2-DICHLOROETHYLENE	Soil	66	16	3	3	66000	66000	24%	1248.643939	8209.591044	7559.406775	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		7559.406775 (ProUCL)	Const. Soil 0-4'
CARBON DISULFIDE	Soil	65	9	2	2	29	29	14%	5.715384615	3.185623505	6.374858228	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	V. High DL (750) removed [2]	6.374858228 (ProUCL)	Const. Soil 0-4'
TRANS-1,2-DICHLOROETHENE	Soil	65	6	5	10	36	36	9%	7.292307692	5.86494639	8.506442815	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		8.506442815 (ProUCL)	Const. Soil 0-4'
1,1,1-TRICHLOROETHANE	Soil	66	4	5	5	16000	16000	6%	248.6893939	1968.685047	1762.029628	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	V. High DL (750) removed [2]	1762.029628 (ProUCL)	Const. Soil 0-4'
CHLOROFORM	Soil	67	4	1	2	460	460	6%	12.59090909	55.93072013	42.60016616	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		42.60016616 (ProUCL)	Const. Soil 0-4'
BENZENE	Soil	65	1	5	15	15	15	2%	5.861538462	1.534773223	6.17926039	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	V. High DL (750) removed [2]	6.17926039 (ProUCL)	Const. Soil 0-4'

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

[2] "Exclude the samples from the quantitative risk assessment... if they cause the calculated exposure concentration to exceed the maximum detected concentration for a particular samle set" (RAGS Part A, Section 5.3.2)

Attachment 1

Chemical CAS No. (numbers only, no dashes)	Initial groundwater conc., CW (ug/L)	Chemical
108883	**3.30E-02**	**Toluene**

Johnson & Ettinger Model
"Intercalcs"

GW-ADV
Version 3.0; 02/03

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm3/cm3)	Stratum B soil air-filled porosity, θ_a^B (cm3/cm3)	Stratum C soil air-filled porosity, θ_a^C (cm3/cm3)	Stratum A effective total fluid saturation, S_{te} (cm3/cm3)	Stratum A soil intrinsic permeability, k_i (cm2)	Stratum A soil relative air permeability, k_{rg} (cm2)	Stratum A soil effective vapor permeability, k_v (cm2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm3/cm3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm3/cm3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm3/cm3)	Floor-wall seam perimeter, X_{crack} (cm)
9.4608E+08	1.0500E+02	3.2100E-01	0.0000E+00	0.0000E+00	3.1056E-03	9.9242E-08	9.9815E-01	9.9059E-08	1.7045E+01	3.7500E-01	1.2174E-01	2.5326E-01	4.0000E+03

Bldg. ventilation rate, $Q_{building}$ (cm3/s)	Area of enclosed space below grade, A_B (cm2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm2/s)	Diffusion path length, L_d (cm)
2.5417E+04	1.8000E+06	2.2222E-04	2.0000E+02	9.1545E+03	2.9214E-03	1.2573E-01	1.7541E-04	1.4064E-02	0.0000E+00	0.0000E+00	5.6217E-04	2.8709E-03	1.0500E+02

Convection path length, L_p (cm)	Source vapor conc., C_{source} (mg/m3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm3/s)	Crack effective diffusion coefficient, D^{crack} (cm2/s)	Area of crack, A_{crack} (cm2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc.,** $C_{building}$ (mg/m3)	Unit risk factor, URF (mg/m3)-1	Reference conc., RfC (mg/m3)
2.0000E+02	4.1492E+00	1.0000E-01	6.8448E+01	1.4064E-02	4.0000E+02	6.9258E+52	1.1264E-03	**4.67E-03**	NA	4.0000E-01

Attachment 2

OMC, Waukegan, Illinois
Summary Statistics
Ecological Soil Outside Building Footprint @ <0.5 feet

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]		Partition
PCB-1248 (AROCHLOR 1248)	Soil	83	70	8	10	730000	730000	84%	17233.12651	95344.60324	18471.32023	ug/Kg	95% H-UCL	LOGNORMAL		18471.32023	(ProUCL)	Eco Soil <0.5'
PCB-1254 (AROCHLOR 1254)	Soil	83	25	8	8.2	190000	190000	30%	4890.387952	23997.49964	31099.03154	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		31099.03154	(ProUCL)	Eco Soil <0.5'
PCB-1260 (AROCHLOR 1260)	Soil	83	19	8	26	210000	210000	23%	4436.885542	25773.28458	32584.93596	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		32584.93596	(ProUCL)	Eco Soil <0.5'
PCB-1260 (AROCHLOR 1260)	Soil	83	19	8	26	210000	210000	23%	4436.885542	25773.28458	32584.93596	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		32584.93596	(ProUCL)	Eco Soil <0.5'
DICHLOROMETHANE	Soil	50	11	2	2	13	6	22%	5.81	1.702009617	6.213546568	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		6	(Max Detected)	Eco Soil <0.5'
TRICHLOROETHYLENE	Soil	50	11	2	2	160	160	22%	11.84	23.03290459	26.03843596	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		26.03843596	(ProUCL)	Eco Soil <0.5'
CARBON DISULFIDE	Soil	50	6	2	2	13	6	12%	5.8	1.767045268	6.218966525	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		6	(Max Detected)	Eco Soil <0.5'
ACETONE	Soil	50	4	5	9	54	54	8%	8.55	8.221580612	10.49933719	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		10.49933719	(ProUCL)	Eco Soil <0.5'
BENZENE	Soil	50	1	5	15	15	15	2%	6.31	1.870528682	6.753502448	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	<5% FOD, retained - Class A Carc.	6.753502448	(ProUCL)	Eco Soil <0.5'
FLUORANTHENE	Soil	64	44	4.2	4.2	150000	150000	69%	6874.229688	20636.72841	59336.13271	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		59336.13271	(ProUCL)	Eco Soil <0.5'
PYRENE	Soil	64	43	5.8	5.8	140000	140000	67%	6451.4625	19049.03981	55002.93255	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		55002.93255	(ProUCL)	Eco Soil <0.5'
1,2-BENZPHENANTHRACENE	Soil	64	40	4.4	4.4	63000	63000	63%	3938.764062	10472.83778	19786.42687	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		19786.42687	(ProUCL)	Eco Soil <0.5'
BENZO(A)PYRENE	Soil	64	39	4	4	40000	40000	61%	2977.5	6454.546016	16581.61001	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		16581.61001	(ProUCL)	Eco Soil <0.5'
BENZO(B)FLUORANTHENE	Soil	64	39	4.8	4.8	51000	51000	61%	3509.9625	8123.252157	18224.72127	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		18224.72127	(ProUCL)	Eco Soil <0.5'
BENZO(A)ANTHRACENE	Soil	64	37	3.9	3.9	47000	47000	58%	2809.521875	6626.612996	14100.4907	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		14100.4907	(ProUCL)	Eco Soil <0.5'
INDENO(1,2,3-C,D)PYRENE	Soil	64	37	3.4	3.4	27000	27000	58%	2511.342187	5144.911606	8910.245203	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		8910.245203	(ProUCL)	Eco Soil <0.5'
BENZO(G,H,I)PERYLENE	Soil	64	35	4.7	4.7	32000	32000	55%	2302.8	4841.534294	8324.382248	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		8324.382248	(ProUCL)	Eco Soil <0.5'
PHENANTHRENE	Soil	64	35	8	8	200000	200000	55%	6515.190625	25669.9454	38441.7821	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		38441.7821	(ProUCL)	Eco Soil <0.5'
BENZO(K)FLUORANTHENE	Soil	64	32	13	13	29000	29000	50%	2492.671875	5017.873993	8733.573856	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		8733.573856	(ProUCL)	Eco Soil <0.5'
BIS(2-ETHYLHEXYL) PHTHALATE	Soil	64	29	25	25	5500	3100	45%	1341.96875	2016.708335	2916.261189	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		2916.261189	(ProUCL)	Eco Soil <0.5'
ANTHRACENE	Soil	64	27	4.3	4.3	17000	17000	42%	1612.403125	2818.595257	5117.986714	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5117.986714	(ProUCL)	Eco Soil <0.5'
DIBENZ(A,H)ANTHRACENE	Soil	64	27	7.2	7.2	13000	13000	42%	1770.521875	2834.829865	5296.297002	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5296.297002	(ProUCL)	Eco Soil <0.5'
CARBAZOLE	Soil	64	20	48	48	17000	17000	31%	1576.375	2771.943496	3740.222698	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3740.222698	(ProUCL)	Eco Soil <0.5'
ACENAPHTHENE	Soil	64	18	4.8	4.8	19000	19000	28%	1483.035938	2910.826445	5103.330618	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5103.330618	(ProUCL)	Eco Soil <0.5'
DI-N-BUTYL PHTHALATE	Soil	46	16	21	21	390	390	35%	134.2826087	75.75476899	182.9690311	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs removed[2]	182.9690311	(ProUCL)	Eco Soil <0.5'
FLUORENE	Soil	64	16	8.4	8.4	17000	17000	25%	1523.951562	2740.944312	4932.958008	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		4932.958008	(ProUCL)	Eco Soil <0.5'
DIBENZOFURAN	Soil	64	14	5.9	5.9	16000	16000	22%	1440.490625	2657.147168	3514.725468	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3514.725468	(ProUCL)	Eco Soil <0.5'
2-METHYLNAPHTHALENE	Soil	52	9	4.2	4.2	3000	3000	17%	355.7480769	606.4977124	880.9905032	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs removed[2]	880.9905032	(ProUCL)	Eco Soil <0.5'
ACETOPHENONE	Soil	29	9	49	49	210	170	31%	151.8965517	52.42296718	168.4565498	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	High DLs removed[2]	168.4565498	(ProUCL)	Eco Soil <0.5'
NAPHTHALENE	Soil	64	9	14	14	5500	5100	14%	1297.695313	2017.158379	2872.339067	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		2872.339067	(ProUCL)	Eco Soil <0.5'
ACENAPHTHYLENE	Soil	52	7	5.2	5.2	2100	2100	13%	340.9942308	529.3112226	799.391196	ug/Kg	97.5% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs removed[2]	799.391196	(ProUCL)	Eco Soil <0.5'
ALUMINUM	Soil	14	14	620	620	1300	1300	100%	912.1428571	262.2441191	1048.079812	mg/Kg	95% Approximate Gamma UCL	GAMMA		1048.079812	(ProUCL)	Eco Soil <0.5'
ARSENIC	Soil	14	14	0.77	0.77	5.4	5.4	100%	2.169285714	1.328147723	2.890117166	mg/Kg	95% Approximate Gamma UCL	GAMMA		2.890117166	(ProUCL)	Eco Soil <0.5'
BARIUM	Soil	14	14	2.7	2.7	7.1	7.1	100%	4.478571429	1.607759345	5.239526831	mg/Kg	95% Student's-t UCL	LOGNORMAL		5.239526831	(ProUCL)	Eco Soil <0.5'
BERYLLIUM	Soil	14	14	0.21	0.21	0.4	0.4	100%	0.267857143	0.049174504	0.291131525	mg/Kg	95% Student's-t UCL	NORMAL		0.291131525	(ProUCL)	Eco Soil <0.5'
CHROMIUM, TOTAL	Soil	14	14	2.4	2.4	10	10	100%	5.128571429	2.596574244	6.939203882	mg/Kg	95% H-UCL	LOGNORMAL		6.939203882	(ProUCL)	Eco Soil <0.5'
COBALT	Soil	14	14	0.95	0.95	1.8	1.8	100%	1.244285714	0.301016593	1.386757411	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		1.386757411	(ProUCL)	Eco Soil <0.5'
COPPER	Soil	14	14	1.4	1.4	4.5	4.5	100%	2.314285714	0.902012402	2.775622741	mg/Kg	95% Approximate Gamma UCL	GAMMA		2.775622741	(ProUCL)	Eco Soil <0.5'
IRON	Soil	14	14	2500	2500	4800	4800	100%	3350	801.6809264	3748.389669	mg/Kg	95% Approximate Gamma UCL	GAMMA		3748.389669	(ProUCL)	Eco Soil <0.5'
LEAD	Soil	14	14	1.8	1.8	11	11	100%	3.921428571	2.52195851	5.178541246	mg/Kg	95% Approximate Gamma UCL	GAMMA		5.178541246	(ProUCL)	Eco Soil <0.5'
MAGNESIUM	Soil	14	14	6100	6100	16000	16000	100%	10678.57143	2645.803229	11930.83488	mg/Kg	95% Student's-t UCL	NORMAL		11930.83488	(ProUCL)	Eco Soil <0.5'
MANGANESE	Soil	14	14	75	75	270	270	100%	107.7142857	48.47906538	130.659515	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		130.659515	(ProUCL)	Eco Soil <0.5'
NICKEL	Soil	14	14	2	2	4.1	4.1	100%	2.764285714	0.69901815	3.095132268	mg/Kg	95% Student's-t UCL	NORMAL		3.095132268	(ProUCL)	Eco Soil <0.5'
VANADIUM	Soil	14	14	5.3	5.3	13	13	100%	7.942857143	2.094209704	8.93405038	mg/Kg	95% Student's-t UCL	NORMAL		8.93405038	(ProUCL)	Eco Soil <0.5'
ZINC	Soil	14	14	10	10	28	28	100%	18.21428571	5.54947775	20.84086356	mg/Kg	95% Student's-t UCL	NORMAL		20.84086356	(ProUCL)	Eco Soil <0.5'
CADMIUM	Soil	14	7	0.09	0.11	0.17	0.17	50%	0.1225	0.030993175	0.137169126	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		0.137169126	(ProUCL)	Eco Soil <0.5'
MERCURY	Soil	14	7	0.006	0.0056	0.0095	0.0087	50%	0.007871429	0.001354439	0.008512487	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		0.008512487	(ProUCL)	Eco Soil <0.5'

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

[2] "Exclude the samples from the quantitative risk assessment... if they cause the calculated exposure concentration to exceed the maximum detected concentration for a particular sample set" (RAGS Part A, Section 5.3.2)

Attachment 2

OMC, Waukegan, Illinois
Summary Statistics
Shallow Groundwater, Focused Area

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]		Partition
PCB-1016 (AROCHLOR 1016)	Water	14	1	0.1	0.19	0.19	0.19	7%	0.106428571	0.024053512	0.117813142	ug/L	95% Student's-t UCL	NON-PARAMETRIC	-	0.117813142	(ProUCL)	Focused GW
PCB-1248 (AROCHLOR 1248)	Water	14	1	0.1	61	61	61	7%	4.153333333	15.72617775	21.85256244	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	21.85256244	(ProUCL)	Focused GW
DI-N-BUTYL PHTHALATE	Water	14	2	0.94	0.94	2.5	1.5	14%	2.317142857	0.477613113	2.543198007	ug/L	95% Student's-t UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	1.5	(Max Detected)	Focused GW
2,4-DIMETHYLPHENOL	Water	14	1	2.5	2.9	2.9	2.9	7%	2.528571429	0.106904497	2.57916952	ug/L	95% Student's-t UCL	NON-PARAMETRIC	-	2.57916952	(ProUCL)	Focused GW
4-METHYLPHENOL (P-CRESOL)	Water	14	1	2.5	12	12	12	7%	3.178571429	2.538981798	4.380276101	ug/L	95% Student's-t UCL	NON-PARAMETRIC	-	4.380276101	(ProUCL)	Focused GW
CIS-1,2-DICHLOROETHYLENE	Water	14	10	0.11	0.11	2100	2100	71%	247.3085714	607.0851935	1206.415527	ug/L	95% Adjusted Gamma UCL	GAMMA	-	1206.415527	(ProUCL)	Focused GW
TRICHLOROETHYLENE	Water	14	8	0.081	0.081	970	970	57%	157.4557857	326.6983653	328.8621169	ug/L	95% Hall's Bootstrap UCL	NON-PARAMETRIC	-	328.8621169	(ProUCL)	Focused GW
1,1-DICHLOROETHANE	Water	14	7	0.065	0.065	2.5	1.6	50%	0.573857143	0.709787493	1.248174113	ug/L	95% Chebyshev (MVUE) UCL	LOGNORMAL	-	1.248174113	(ProUCL)	Focused GW
BENZENE	Water	14	7	0.042	0.042	1.9	1.9	50%	0.489928571	0.573870324	1.283100303	ug/L	95% Chebyshev (MVUE) UCL	LOGNORMAL	-	1.283100303	(ProUCL)	Focused GW
TRANS-1,2-DICHLOROETHENE	Water	14	7	0.19	0.19	17	17	50%	2.360714286	4.531989654	14.41225269	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	14.41225269	(ProUCL)	Focused GW
VINYL CHLORIDE	Water	14	7	0.25	2.1	200	200	50%	18.61785714	52.65753145	158.6455958	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	158.6455958	(ProUCL)	Focused GW
1,1-DICHLOROETHYLENE	Water	14	3	0.12	0.12	19	19	21%	1.697857143	4.999644877	14.9929917	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	14.9929917	(ProUCL)	Focused GW
1,2-DICHLOROETHANE	Water	14	3	0.067	0.067	1.25	0.87	21%	0.340571429	0.320048726	0.713416911	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	0.713416911	(ProUCL)	Focused GW
CARBON DISULFIDE	Water	14	3	0.11	0.11	2.5	0.14	21%	0.456428571	0.651018222	1.214841848	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	0.14	(Max Detected)	Focused GW
CHLOROFORM	Water	14	3	0.052	0.052	2.5	0.67	21%	0.484214286	0.653238345	2.221316001	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	0.67	(Max Detected)	Focused GW
METHYLCYCLOHEXANE	Water	14	2	0.1	0.1	2.5	0.14	14%	0.463571429	0.647986315	1.21845264	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	0.14	(Max Detected)	Focused GW
1,4-DICHLOROBENZENE	Water	14	1	0.25	1	2.5	1	7%	0.535714286	0.649386862	1.292227086	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	1	(Max Detected)	Focused GW
DICHLOROMETHANE	Water	14	1	0.25	1.1	1.25	1.1	7%	0.382142857	0.337186973	0.774953794	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	0.774953794	(ProUCL)	Focused GW
M-DICHLOROBENZENE	Water	14	1	0.25	0.81	2.5	0.81	7%	0.522142857	0.640866944	1.268730253	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	0.81	(Max Detected)	Focused GW
METHYLBENZENE	Water	14	1	0.033	0.033	2.5	0.033	7%	0.466642857	0.647629477	1.221108366	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.033	(Max Detected)	Focused GW
MAGNESIUM (DISSOLVED)	Water	14	14	11800	11800	40500	40500	100%	23714.28571	7977.261641	27489.93806	ug/L	95% Student's-t UCL	NORMAL	-	27489.93806	(ProUCL)	Focused GW
MAGNESIUM (TOTAL)	Water	14	14	11900	11900	39900	39900	100%	23871.42857	8098.093657	27704.27093	ug/L	95% Student's-t UCL	NORMAL	-	27704.27093	(ProUCL)	Focused GW
MANGANESE (DISSOLVED)	Water	14	13	7.5	131	807	807	93%	342.5357143	209.5849804	441.7326642	ug/L	95% Student's-t UCL	NORMAL	-	441.7326642	(ProUCL)	Focused GW
MANGANESE (TOTAL)	Water	14	13	7.5	138	795	795	93%	351.1071429	210.3040088	450.6444102	ug/L	95% Student's-t UCL	NORMAL	-	450.6444102	(ProUCL)	Focused GW
IRON (DISSOLVED)	Water	14	11	9.1	9.1	4410	4410	79%	679.9857143	1157.107205	1502.151358	ug/L	95% Approximate Gamma UCL	GAMMA	-	1502.151358	(ProUCL)	Focused GW
IRON (TOTAL)	Water	14	12	50	95.2	5790	5790	86%	1539.871429	1596.626824	2962.690925	ug/L	95% Approximate Gamma UCL	GAMMA	-	2962.690925	(ProUCL)	Focused GW
ZINC (DISSOLVED)	Water	14	7	5	5	30	24.3	50%	19.97857143	11.34481776	33.19488416	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	24.3	(Max Detected)	Focused GW
ZINC (TOTAL)	Water	14	6	2.5	2.5	30	11.4	43%	20.74285714	11.28850432	33.89356669	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	11.4	(Max Detected)	Focused GW
ARSENIC (DISSOLVED)	Water	14	6	5	6.5	269	269	43%	38.13571429	75.76064137	239.5996074	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	239.5996074	(ProUCL)	Focused GW
ARSENIC (TOTAL)	Water	14	4	5	22.3	357	357	29%	50.82142857	105.7102293	331.9277386	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	331.9277386	(ProUCL)	Focused GW
NICKEL (DISSOLVED)	Water	14	4	2.5	2.5	20	8	29%	15.59285714	7.331435402	24.13372092	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	8	(Max Detected)	Focused GW
NICKEL (TOTAL)	Water	14	2	3.2	3.2	20	6.9	14%	17.86428571	5.477170401	24.24499613	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	6.9	(Max Detected)	Focused GW
VANADIUM (DISSOLVED)	Water	14	3	0.81	0.81	25	1.7	21%	19.88714286	10.1617529	46.90943653	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.7	(Max Detected)	Focused GW
VANADIUM (TOTAL)	Water	14	3	0.99	0.99	25	1.7	21%	19.91357143	10.10854749	46.79438045	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.7	(Max Detected)	Focused GW
COPPER (DISSOLVED)	Water	14	1	6.4	6.4	12.5	6.4	7%	12.06428571	1.630293576	12.83590661	ug/L	95% Student's-t UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	6.4	(Max Detected)	Focused GW
COPPER (TOTAL)	Water	14	3	1.6	1.6	12.5	6.6	21%	10.55	4.0252568	15.23928226	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>max det'd, *consider* max	6.6	(Max Detected)	Focused GW
ALUMINUM (DISSOLVED)	Water	14	1	13.3	13.3	100	13.3	7%	93.80714286	23.17154967	120.8011813	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC almost 10x max det'd, use max	13.3	(Max Detected)	Focused GW
ALUMINUM (TOTAL)	Water	14	2	16.5	16.5	100	22.1	14%	88.47142857	29.32568915	122.6348226	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC almost 10x max det'd, use max	22.1	(Max Detected)	Focused GW
COBALT (DISSOLVED)	Water	14	2	1	1	25	1.3	14%	21.59285714	8.661005829	44.62434053	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.3	(Max Detected)	Focused GW
COBALT (TOTAL)	Water	14	1	1.2	1.2	25	1.2	7%	23.3	6.360817558	30.7101282	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.2	(Max Detected)	Focused GW
CYANIDE	Water	14	3	5	6	21.2	21.2	21%	6.321428571	4.302803839	8.357953403	ug/L	95% Student's-t UCL	NON-PARAMETRIC	-	8.357953403	(ProUCL)	Focused GW

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

Attachment 2

OMC, Waukegan, Illinois
Summary Statistics
Recreational Users Soil @ 0-0.5 feet

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]		Partition
PCB-1248 (AROCHLOR 1248)	Soil	67	63	8	10	730000	730000	94%	21278.73881	105873.2153	33589.44795	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		33589.44795	(ProUCL)	Recr. Soil 0-0.5'
PCB-1254 (AROCHLOR 1254)	Soil	67	19	8	28	190000	190000	28%	6158.746269	26649.35261	38552.91644	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		38552.91644	(ProUCL)	Recr. Soil 0-0.5'
PCB-1260 (AROCHLOR 1260)	Soil	67	16	8	26	210000	210000	24%	5528.029851	28622.42843	40320.61301	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		40320.61301	(ProUCL)	Recr. Soil 0-0.5'
ACETONE	Soil	35	4	5	9	54	54	11%	9.542857143	9.66754077	16.66578902	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		16.66578902	(ProUCL)	Recr. Soil 0-0.5'
CARBON DISULFIDE	Soil	35	3	2	2	13	6	9%	5.842857143	1.731080199	6.337631584	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		6	(Max Detected)	Recr. Soil 0-0.5'
CIS-1,2-DICHLOROETHYLENE	Soil	35	2	5	5	13	13	6%	6.314285714	1.882917457	6.852458026	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		6.852458026	(ProUCL)	Recr. Soil 0-0.5'
CYCLOHEXANE	Soil	35	2	3	3	13	7	6%	6.085714286	1.56940282	6.534278369	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		6.534278369	(ProUCL)	Recr. Soil 0-0.5'
DICHLOROMETHANE	Soil	35	4	2	2	13	5	11%	5.928571429	1.724148797	6.421364748	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	EPC slightly higer than max detected	5	(Max Detected)	Recr. Soil 0-0.5'
METHYLBENZENE	Soil	35	2	5	68	68	68	6%	9.628571429	14.65402116	20.4254842	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		20.4254842	(ProUCL)	Recr. Soil 0-0.5'
TRICHLOROETHYLENE	Soil	35	7	2	2	160	160	20%	11.38571429	26.4261139	30.8561684	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		30.8561684	(ProUCL)	Recr. Soil 0-0.5'
1,2-BENZPHENANTHRACENE	Soil	48	28	4.4	4.4	24000	24000	58%	2259.852083	4455.60786	8658.731704	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		8658.731704	(ProUCL)	Recr. Soil 0-0.5'
2-METHYLNAPHTHALENE	Soil	35	7	4.2	4.2	900	900	20%	149.4257143	186.2838431	462.7245379	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (1750-5500) removed[2,3]	462.7245379	(ProUCL)	Recr. Soil 0-0.5'
ACENAPHTHENE	Soil	48	10	4.8	4.8	5500	4200	21%	1273.88125	1960.383648	4089.267919	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		4089.267919	(ProUCL)	Recr. Soil 0-0.5'
ACENAPHTHYLENE	Soil	39	4	5.2	5.2	2100	2100	10%	354.9666667	596.3904639	1305.168763	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (3350-5500) removed[2,3]	1305.168763	(ProUCL)	Recr. Soil 0-0.5'
ACETOPHENONE	Soil	19	4	1	52	210	170	21%	162.8333333	48.37993021	181.8678694	ug/Kg	95% Modified-t UCL	NON-PARAMETRIC	High DLs (850-5500) removed[2,3]	170	(Max Detected)	Recr. Soil 0-0.5'
ANTHRACENE	Soil	48	17	4.3	4.3	6200	6200	35%	1335.683333	2046.862921	4275.266402	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		4275.266402	(ProUCL)	Recr. Soil 0-0.5'
BENZALDEHYDE	Soil	17	2	42	42	225	45	12%	170.1176471	49.61335802	191.1258754	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	High DLs (850-5500) removed[2,3]	45	(Max Detected)	Recr. Soil 0-0.5'
BENZO(A)ANTHRACENE	Soil	48	26	3.9	3.9	17000	17000	54%	1945.2375	3513.058549	6990.483729	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		6990.483729	(ProUCL)	Recr. Soil 0-0.5'
BENZO(A)PYRENE	Soil	48	28	4	4	20000	20000	58%	2265.416667	4416.564905	8608.225111	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		8608.225111	(ProUCL)	Recr. Soil 0-0.5'
BENZO(B)FLUORANTHENE	Soil	48	28	4.8	4.8	24000	24000	58%	2487.220833	5018.999912	9695.210688	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		9695.210688	(ProUCL)	Recr. Soil 0-0.5'
BENZO(G,H,I)PERYLENE	Soil	48	24	4.7	4.7	12000	12000	50%	1722.566667	2853.759833	5820.967201	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		5820.967201	(ProUCL)	Recr. Soil 0-0.5'
BENZO(K)FLUORANTHENE	Soil	48	21	13	13	21000	21000	44%	1909.333333	3677.368074	7190.551152	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		7190.551152	(ProUCL)	Recr. Soil 0-0.5'
BIS(2-ETHYLHEXYL) PHTHALATE	Soil	34	21	25	25	850	770	62%	170.6764706	192.9086329	247.8472035	ug/Kg	95% H-UCL	LOGNORMAL	High DLs (1750-5500) removed[2,3]	247.8472035	(ProUCL)	Recr. Soil 0-0.5'
CARBAZOLE	Soil	48	11	48	48	5700	5700	23%	1328.125	2013.372503	4219.611118	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		4219.611118	(ProUCL)	Recr. Soil 0-0.5'
DIBENZ(A,H)ANTHRACENE	Soil	48	17	7.2	7.2	6500	6500	35%	1516.883333	2196.870593	4671.89852	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		4671.89852	(ProUCL)	Recr. Soil 0-0.5'
DIBENZOFURAN	Soil	39	7	5.9	5.9	3200	3200	18%	394.4717949	679.8984866	1477.723467	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (5000-5500) removed[1,2]	1477.723467	(ProUCL)	Recr. Soil 0-0.5'
DI-N-BUTYL PHTHALATE	Soil	34	12	21	21	225	180	35%	117.8529412	66.49772489	167.562983	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (850-5500) removed[2,3]	167.562983	(ProUCL)	Recr. Soil 0-0.5'
FLUORANTHENE	Soil	48	33	4.2	4.2	45000	45000	69%	4051.035417	9434.726706	17600.63007	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		17600.63007	(ProUCL)	Recr. Soil 0-0.5'
FLUORENE	Soil	39	9	8.4	8.4	3400	3400	23%	430.7153846	746.9146511	1620.740897	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (5000-5500) removed[1,2]	1620.740897	(ProUCL)	Recr. Soil 0-0.5'
INDENO(1,2,3-C,D)PYRENE	Soil	48	26	3.4	3.4	15000	15000	54%	1883.08125	3340.850324	6681.012244	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		6681.012244	(ProUCL)	Recr. Soil 0-0.5'
NAPHTHALENE	Soil	34	5	14	14	1300	1300	15%	164.3382353	251.2367205	593.0459062	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	High DLs (1750-5500) removed[2,3]	593.0459062	(ProUCL)	Recr. Soil 0-0.5'
PHENANTHRENE	Soil	48	24	8	8	47000	47000	50%	3352.420833	8183.886074	15105.63239	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		15105.63239	(ProUCL)	Recr. Soil 0-0.5'
PHENOL	Soil	48	4	43	43	20000	20000	8%	1795.479167	3384.714916	6656.405886	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		6656.405886	(ProUCL)	Recr. Soil 0-0.5'
PYRENE	Soil	48	32	5.8	5.8	45000	45000	67%	4015.7625	8841.765078	16713.78085	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		16713.78085	(ProUCL)	Recr. Soil 0-0.5'
ALUMINUM (FUME OR DUST)	Soil	14	14	620	620	1300	1300	100%	912.1428571	262.2441191	1048.079812	mg/Kg	95% Approximate Gamma UCL	GAMMA		1048.079812	(ProUCL)	Recr. Soil 0-0.5'
ARSENIC	Soil	14	14	0.77	0.77	5.4	5.4	100%	2.169285714	1.328147723	2.890117166	mg/Kg	95% Approximate Gamma UCL	GAMMA		2.890117166	(ProUCL)	Recr. Soil 0-0.5'
BARIUM	Soil	14	14	2.7	2.7	7.1	7.1	100%	4.478571429	1.607759345	5.239526831	mg/Kg	95% Student's-t UCL	LOGNORMAL		5.239526831	(ProUCL)	Recr. Soil 0-0.5'
BERYLLIUM	Soil	14	14	0.21	0.21	0.4	0.4	100%	0.267857143	0.049174504	0.291131525	mg/Kg	95% Student's-t UCL	NORMAL		0.291131525	(ProUCL)	Recr. Soil 0-0.5'
CADMIUM	Soil	14	7	0.09	0.11	0.17	0.17	50%	0.1225	0.030993175	0.137169126	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		0.137169126	(ProUCL)	Recr. Soil 0-0.5'
CALCIUM METAL	Soil	14	14	12000	12000	31000	31000	100%	20857.14286	5126.959556	23283.74208	mg/Kg	95% Student's-t UCL	NORMAL	Essential nutrient?	23283.74208	(ProUCL)	Recr. Soil 0-0.5'
CHROMIUM, TOTAL	Soil	14	14	2.4	2.4	10	10	100%	5.128571429	2.596574244	6.939203882	mg/Kg	95% H-UCL	LOGNORMAL		6.939203882	(ProUCL)	Recr. Soil 0-0.5'
COBALT	Soil	14	14	0.95	1	1.8	1.8	100%	1.244285714	0.301016593	1.386757411	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		1.386757411	(ProUCL)	Recr. Soil 0-0.5'
COPPER	Soil	14	14	1.4	1.4	4.5	4.5	100%	2.314285714	0.902012402	2.775622741	mg/Kg	95% Approximate Gamma UCL	GAMMA		2.775622741	(ProUCL)	Recr. Soil 0-0.5'
IRON	Soil	14	14	2500	2500	4800	4800	100%	3350	801.6809264	3748.389669	mg/Kg	95% Approximate Gamma UCL	GAMMA	Essential nutrient?	3748.389669	(ProUCL)	Recr. Soil 0-0.5'
LEAD	Soil	14	14	1.8	1.8	11	11	100%	3.921428571	2.52195851	5.178541246	mg/Kg	95% Approximate Gamma UCL	GAMMA		5.178541246	(ProUCL)	Recr. Soil 0-0.5'
MAGNESIUM	Soil	14	14	6100	6100	16000	16000	100%	10678.57143	2645.803229	11930.83488	mg/Kg	95% Student's-t UCL	NORMAL	Essential nutrient?	11930.83488	(ProUCL)	Recr. Soil 0-0.5'
MANGANESE	Soil	15	14	1	75	270	270	93%	107.7142857	48.47906538	130.659515	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		130.659515	(ProUCL)	Recr. Soil 0-0.5'
MERCURY	Soil	14	7	0.0056	0.0056	0.0095	0.0087	50%	0.007871429	0.001354439	0.008512487	mg/Kg	95% Student's-t UCL	NON-PARAMETRIC		0.008512487	(ProUCL)	Recr. Soil 0-0.5'
NICKEL	Soil	14	14	2	2	4.1	4.1	100%	2.764285714	0.69901815	3.095132268	mg/Kg	95% Student's-t UCL	NORMAL		3.095132268	(ProUCL)	Recr. Soil 0-0.5'
POTASSIUM	Soil	14	14	94	94	220	220	100%	137.2857143	42.62795863	157.4616041	mg/Kg	95% Student's-t UCL	NORMAL	Essential nutrient?	157.4616041	(ProUCL)	Recr. Soil 0-0.5'
SODIUM	Soil	14	14	98	98	200	200	100%	135.5714286	32.68665756	151.0420827	mg/Kg	95% Student's-t UCL	NORMAL	Essential nutrient?	151.0420827	(ProUCL)	Recr. Soil 0-0.5'
VANADIUM (FUME OR DUST)	Soil	14	14	5.3	5.3	13	13	100%	7.942857143	2.094209704	8.93405038	mg/Kg	95% Student's-t UCL	NORMAL		8.93405038	(ProUCL)	Recr. Soil 0-0.5'
ZINC	Soil	14	14	10	10	28	28	100%	18.21428571	5.54947775	20.84086356	mg/Kg	95% Student's-t UCL	NORMAL		20.84086356	(ProUCL)	Recr. Soil 0-0.5'

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.
[2] "Exclude the samples from the quantitative risk assessment... if they cause the calculated exposure concentration to exceed the maximum detected concentration for a particular samle set" (RAGS Part A, Section 5.3.2)
[3] The following are initial summary statistics that were recalculated. The recalculated stats are included above.

Attachment 2

OMC, Waukegan, Illinois
Summary Statistics
Residential Soil @ 0-0.5 feet

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]	Partition
PCB-1248 (AROCHLOR 1248)	Soil	21	12	16	16	3700	3700	0.5714	500.5238095	874.5616827	2399.407636	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		2399.407636 (ProUCL)	Res Soil 0-5'
PCB-1254 (AROCHLOR 1254)	Soil	21	12	8.2	8.2	3700	3700	0.5714	453.9142857	861.4018222	1508.723377	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		1508.723377 (ProUCL)	Res Soil 0-5'
PCB-1260 (AROCHLOR 1260)	Soil	21	8	16.5	40	350	350	0.381	89.30952381	96.11405675	297.9962654	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		297.9962654 (ProUCL)	Res Soil 0-5'
1,2-BENZPHENANTHRACENE	Soil	21	18	36	36	63000	63000	86%	8081.333333	16952.78809	18096.24016	ug/Kg	95% Adjusted Gamma UCL	GAMMA		18096.24016 (ProUCL)	Res Soil 0-5'
BENZO(A)ANTHRACENE	Soil	21	17	48	48	47000	47000	0.8095	5128	10558.67378	17061.57138	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		17061.57138 (ProUCL)	Res Soil 0-5'
BENZO(A)PYRENE	Soil	21	17	50	50	40000	40000	0.8095	4868.095238	9357.207179	10186.7216	ug/Kg	95% Adjusted Gamma UCL	GAMMA		10186.7216 (ProUCL)	Res Soil 0-5'
BENZO(B)FLUORANTHENE	Soil	21	17	51	51	51000	51000	81%	5960.047619	12236.64983	18789.66872	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		18789.66872 (ProUCL)	Res Soil 0-5'
BENZO(K)FLUORANTHENE	Soil	21	17	53	53	29000	29000	81%	4067.761905	7052.031919	8333.418851	ug/Kg	95% Adjusted Gamma UCL	GAMMA		8333.418851 (ProUCL)	Res Soil 0-5'
FLUORANTHENE	Soil	21	17	91	91	150000	150000	81%	15209.57143	34061.0975	66849.89937	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		66849.89937 (ProUCL)	Res Soil 0-5'
INDENO(1,2,3-C,D)PYRENE	Soil	21	17	38	38	27000	27000	81%	4048.809524	7558.93307	13065.47993	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		13065.47993 (ProUCL)	Res Soil 0-5'
PHENANTHRENE	Soil	21	17	66	66	200000	200000	81%	15851.2381	43928.52941	63909.68797	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		63909.68797 (ProUCL)	Res Soil 0-5'
PYRENE	Soil	21	17	97	97	140000	140000	81%	13112.2381	31004.15364	41412.67397	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		41412.67397 (ProUCL)	Res Soil 0-5'
ANTHRACENE	Soil	21	15	17	17	17000	17000	71%	2655.952381	4325.759384	15192.8293	ug/Kg	97.5% Chebyshev (MVUE) UCL	LOGNORMAL		15192.8293 (ProUCL)	Res Soil 0-5'
BENZO(G,H,I)PERYLENE	Soil	21	15	36	36	32000	32000	71%	3664.809524	7358.403071	11052.95124	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		11052.95124 (ProUCL)	Res Soil 0-5'
DIBENZ(A,H)ANTHRACENE	Soil	21	15	39	39	13000	13000	71%	2317.238095	3801.29291	7338.951421	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		7338.951421 (ProUCL)	Res Soil 0-5'
CARBAZOLE	Soil	21	13	48	48	17000	17000	62%	2202.904762	3919.705511	6875.491242	ug/Kg	95% Chebyshev (MVUE) UCL	LOGNORMAL		6875.491242 (ProUCL)	Res Soil 0-5'
ACENAPHTHENE	Soil	21	11	42	42	19000	19000	52%	1947.714286	4241.080442	11156.1203	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		11156.1203 (ProUCL)	Res Soil 0-5'
BIS(2-ETHYLHEXYL) PHTHALAT	Soil	21	10	36	36	5000	3100	48%	1154.904762	1712.478026	4873.106568	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3100 (Max Detected)	Res Soil 0-5'
FLUORENE	Soil	21	10	49	49	17000	17000	48%	1986.142857	3839.31549	10322.2205	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		10322.2205 (ProUCL)	Res Soil 0-5'
DIBENZOFURAN	Soil	21	9	70	70	16000	16000	43%	1715.571429	3619.789339	9575.00498	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		9575.00498 (ProUCL)	Res Soil 0-5'
NAPHTHALENE	Soil	21	6	62	62	5100	5100	29%	1190.238095	1926.847838	3023.035972	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	Recommended Alternate 2 UCL	3023.035972 (ProUCL)	Res Soil 0-5'
2-METHYLNAPHTHALENE	Soil	21	5	51	51	5000	3000	24%	1122.47619	1768.079654	4961.402507	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		3000 (Max Detected)	Res Soil 0-5'
ACETOPHENONE	Soil	14	5	49	49	190	130	36%	144.5714286	53.59063392	207.0026278	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed[2]	130 (Max Detected)	Res Soil 0-5'
DI-N-BUTYL PHTHALATE	Soil	15	5	43	43	390	390	33%	171.8666667	82.39700642	264.6014378	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed[2]	264.6014378 (ProUCL)	Res Soil 0-5'
ACENAPHTHENE	Soil	21	11	42	42	19000	19000	52%	1947.714286	4241.080442	11156.1203	ug/Kg	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		11156.1203 (ProUCL)	Res Soil 0-5'
HEXACHLOROBENZENE	Soil	14	2	59	59	230	230	14%	185.2857143	43.47842714	205.8641324	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC	V. High DLs (850-5000) removed[2]	205.8641324 (ProUCL)	Res Soil 0-5'
DICHLOROMETHANE	Soil	21	8	2	2	9	6	38%	5.523809524	1.66189794	6.149288637	ug/Kg	95% Student's-t UCL	NORMAL		6 (Max Detected)	Res Soil 0-5'
TRICHLOROETHYLENE	Soil	21	4	5	15	40	40	19%	10.97619048	11.03910797	21.47647662	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		21.47647662 (ProUCL)	Res Soil 0-5'
CARBON DISULFIDE	Soil	21	3	2	2	9	3	14%	5.785714286	1.639904178	6.402915732	ug/Kg	95% Student's-t UCL	NORMAL		3 (Max Detected)	Res Soil 0-5'
METHYLBENZENE	Soil	21	2	5	68	68	68	10%	12.04761905	18.62988511	29.76817445	ug/Kg	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC		29.76817445 (ProUCL)	Res Soil 0-5'
BENZENE	Soil	21	1	5	15	15	15	5%	6.571428571	2.19821356	7.398757757	ug/Kg	95% Student's-t UCL	NON-PARAMETRIC		7.398757757 (ProUCL)	Res Soil 0-5'

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

[2] "Exclude the samples from the quantitative risk assessment... if they cause the calculated exposure concentration to exceed the maximum detected concentration for a particular samle set" (RAGS Part A, Section 5.3.2)

Attachment 2

OMC, Waukegan, Illinois

Summary Statistics

Shallow Groundwater, Site-Wide

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	FINAL EPC[1]	Partition
PCB-1016 (AROCHLOR 1016)	Water	26	2	0.1	0.19	14	14	8%	0.638076923	2.725365325	2.9678566	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	2.9678566 (ProUCL)	Site Wide GW
PCB-1248 (AROCHLOR 1248)	Water	26	1	0.1	61	61	61	4%	2.442307692	11.94347263	25.74797497	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	<5% F.O.D., retained because PCB	25.74797497 (ProUCL)	Site Wide GW
DI-N-BUTYL PHTHALATE	Water	26	4	0.53	0.53	2.5	1.5	15%	2.254615385	0.605687912	2.457517143	ug/L	95% Student's-t UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	1.5 (Max Detected)	Site Wide GW
4-METHYLPHENOL (P-CRESOL)	Water	26	3	2.5	6.4	28	28	12%	3.996153846	5.282081466	8.511543376	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	8.511543376 (ProUCL)	Site Wide GW
CIS-1,2-DICHLOROETHYLENE	Water	26	21	0.11	0.11	51000	51000	81%	2418.014231	9994.971189	28355.60184	ug/L	95% Hall's Bootstrap UCL	NON-PARAMETRIC	-	28355.60184 (ProUCL)	Site Wide GW
VINYL CHLORIDE	Water	26	16	0.25	0.43	10000	10000	62%	442.9780769	1961.263776	4270.0527	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	4270.0527 (ProUCL)	Site Wide GW
TRICHLOROETHYLENE	Water	26	15	0.06	0.06	970	970	58%	103.2181154	255.8534731	202.9568347	ug/L	95% Hall's Bootstrap UCL	NON-PARAMETRIC	-	202.9568347 (ProUCL)	Site Wide GW
TRANS-1,2-DICHLOROETHENE	Water	26	14	0.14	0.14	130	130	54%	8.425	25.88976327	58.94449523	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	58.94449523 (ProUCL)	Site Wide GW
1,1-DICHLOROETHANE	Water	26	13	0.065	0.065	480	480	50%	18.63940741	92.21542848	95.99620934	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	95.99620934 (ProUCL)	Site Wide GW
BENZENE	Water	26	12	0.031	0.031	50	1.9	46%	2.477461538	9.746579183	21.49626273	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.9 (Max Detected)	Site Wide GW
1,1-DICHLOROETHYLENE	Water	26	6	0.12	0.12	300	300	23%	13.03538462	58.66216902	127.5046881	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	127.5046881 (ProUCL)	Site Wide GW
CARBON DISULFIDE	Water	26	6	0.11	0.11	50	0.2	23%	2.486153846	9.746275218	21.5043619	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.2 (Max Detected)	Site Wide GW
CHLOROFORM	Water	26	6	0.048	0.048	140	140	23%	5.957153846	27.35920752	59.34402107	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	59.34402107 (ProUCL)	Site Wide GW
1,2-DICHLOROETHANE	Water	26	5	0.062	0.062	50	0.87	19%	2.420230769	9.752277823	21.4501519	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.87 (Max Detected)	Site Wide GW
METHYLBENZENE	Water	26	4	0.033	0.033	51	51	15%	2.371653846	9.931458499	21.75121576	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	21.75121576 (ProUCL)	Site Wide GW
METHYLCYCLOHEXANE	Water	26	3	0.1	0.1	50	0.14	12%	2.493846154	9.744410942	21.50841639	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.14 (Max Detected)	Site Wide GW
M-DICHLOROBENZENE	Water	26	2	0.09	0.09	50	0.81	8%	2.525	9.737474929	21.52603578	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.81 (Max Detected)	Site Wide GW
XYLENES, TOTAL	Water	26	2	0.07	0.07	50	0.87	8%	2.488076923	9.744476597	21.50277528	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	0.87 (Max Detected)	Site Wide GW
MAGNESIUM (DISSOLVED)	Water	26	26	11200	11200	47300	47300	100%	25153.84615	8895.897066	28133.91745	ug/L	95% Student's-t UCL	NORMAL	-	28133.91745 (ProUCL)	Site Wide GW
MAGNESIUM (TOTAL)	Water	26	26	10800	10800	47300	47300	100%	25300	9077.224245	28340.8148	ug/L	95% Student's-t UCL	NORMAL	-	28340.8148 (ProUCL)	Site Wide GW
MANGANESE (DISSOLVED)	Water	26	25	7.5	53.3	1100	1100	96%	368.4	262.932443	489.6630007	ug/L	95% Approximate Gamma UCL	GAMMA	-	489.6630007 (ProUCL)	Site Wide GW
MANGANESE (TOTAL)	Water	26	25	7.5	53.8	1080	1080	96%	374.2846154	261.0251171	496.7921677	ug/L	95% Approximate Gamma UCL	GAMMA	-	496.7921677 (ProUCL)	Site Wide GW
IRON (DISSOLVED)	Water	26	22	9.1	9.1	32000	32000	85%	2757.030769	6503.693541	13759.50183	ug/L	97.5% Chebyshev (MVUE) UCL	LOGNORMAL	-	13759.50183 (ProUCL)	Site Wide GW
IRON (TOTAL)	Water	26	23	50	95.2	35100	35100	88%	4500.815385	7367.670676	7633.412096	ug/L	95% Approximate Gamma UCL	GAMMA	-	7633.412096 (ProUCL)	Site Wide GW
ZINC (DISSOLVED)	Water	26	13	2.9	2.9	30	24.3	50%	19.23846154	11.58992932	29.14611742	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	24.3 (Max Detected)	Site Wide GW
ZINC (TOTAL)	Water	26	13	2.4	2.4	59.3	59.3	50%	21.24230769	13.5076326	32.78931302	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	32.78931302 (ProUCL)	Site Wide GW
ARSENIC (DISSOLVED)	Water	26	11	5	6.5	269	269	42%	37.20769231	68.2721022	170.4291554	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	170.4291554 (ProUCL)	Site Wide GW
ARSENIC (TOTAL)	Water	26	9	5	12.2	357	357	35%	50.15	92.83004363	231.2921332	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	231.2921332 (ProUCL)	Site Wide GW
NICKEL (DISSOLVED)	Water	26	8	2.3	2.3	20	8.7	31%	15.39230769	7.206048741	21.55240144	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	8.7 (Max Detected)	Site Wide GW
NICKEL (TOTAL)	Water	26	7	2.2	2.2	20	8.8	27%	15.97307692	6.907419645	21.87788747	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	8.8 (Max Detected)	Site Wide GW
VANADIUM (DISSOLVED)	Water	26	6	0.81	0.81	25	1.7	23%	19.48692308	10.26605154	39.51938673	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	1.7 (Max Detected)	Site Wide GW
VANADIUM (TOTAL)	Water	26	6	0.99	0.99	25	2.3	23%	19.56884615	10.11451801	39.30561776	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, use max	2.3 (Max Detected)	Site Wide GW
CYANIDE	Water	26	10	1.4	1.4	99.2	99.2	38%	9.730769231	18.90887134	25.89502573	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	-	25.89502573 (ProUCL)	Site Wide GW
COPPER (DISSOLVED)	Water	26	2	1.7	1.7	12.5	6.4	8%	11.85	2.390522955	12.65081062	ug/L	95% Student's-t UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	6.4 (Max Detected)	Site Wide GW
COPPER (TOTAL)	Water	26	7	1.6	1.6	12.5	6.6	27%	9.876923077	4.487877689	13.71338718	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	6.6 (Max Detected)	Site Wide GW
COBALT (DISSOLVED)	Water	26	5	0.92	0.92	25	4.2	19%	20.63923077	9.139786397	38.47397845	ug/L	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	4.2 (Max Detected)	Site Wide GW
COBALT (TOTAL)	Water	26	3	0.7	0.7	25	3.9	12%	22.33846154	7.531166015	28.77648193	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	3.9 (Max Detected)	Site Wide GW
ALUMINUM (DISSOLVED)	Water	26	3	13.3	13.3	100	21.2	12%	90.48846154	26.88149292	113.4681169	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	21.2 (Max Detected)	Site Wide GW
ALUMINUM (TOTAL)	Water	26	3	16.5	16.5	100	27.4	12%	91	25.46010212	112.7645788	ug/L	95% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	EPC>10x max det'd, *consider* max	27.4 (Max Detected)	Site Wide GW
CHROMIUM (TOTAL)	Water	26	2	3.9	3.9	5.2	5.2	8%	4.965384615	0.220802731	5.039352185	ug/L	95% Student's-t UCL	NON-PARAMETRIC	-	5.039352185 (ProUCL)	Site Wide GW

Attachment 2

OMC, Waukegan, Illinois
Summary Statistics

Interior **Non-Porous** Wipe Samples (Bare Metal)

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	**FINAL EPC**[1]		Partition
PCB-1248 (AROCHLOR 1248)	Water	62	62	0.71	0.71	600	600	100%	103.8420968	119.3716107	134.3088949	ug/100cm2	95% Approximate Gamma UCL	GAMMA	--	134.3088949	(ProUCL)	Trespasser

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

OMC, Waukegan, Illinois
Summary Statistics
Interior **Porous** Wipe Samples (Painted Surfaces, Concrete, etc.)

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	**FINAL EPC**[1]		Partition
PCB-1248 (AROCHLOR 1248)	Water	63	56	0.005	0.33	750	750	89%	48.09150794	134.289575	216.4323991	ug/100cm2	99% Chebyshev (Mean, Sd) UCL	NON-PARAMETRIC	--	216.4323991	(ProUCL)	Trespasser

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

OMC, Waukegan, Illinois
Summary Statistics
Interior Wipe Samples **Combined** (Porous and Non-Porous)

Chemical	Media	N	Detects	Min	Min Det'd	Max	Max Det'd	F.O.D.	Mean	Std. Dev.	ProUCL EPC	Units	EPC Based on	Distribution	Comment	**FINAL EPC**[1]		Partition
PCB-1248 (AROCHLOR 1248)	Water	125	118	0.005	0.33	750	750	94%	75.7438	129.6532607	97.68336144	ug/100cm2	95% Adjusted Gamma UCL	GAMMA	--	97.68336144	(ProUCL)	Trespasser

[1] Final EPC: The ProUCL recommended EPC is used unless it exceeds the maximum *detected* value, then the maximum detected value is used as the EPC.

Appendix F
Ecological Risk Assessment

APPENDIX F

Ecological Risk Assessment

Introduction

This appendix presents the ecological risk assessment (ERA) for the Outboard Marine Corporation (OMC) Plant 2 (Operable Unit 4) in Waukegan, Illinois. The remedial investigation (RI) for the OMC Plant 2 site is being conducted so that the U.S. Environmental Protection Agency (USEPA), in consultation with the Illinois Environmental Protection Agency (IEPA), can evaluate potential impacts to human health and the environment resulting from historical site activities and, if warranted, select a remedial action to eliminate, reduce, or control risks found to be unacceptable. The overall objective of the ERA is to evaluate whether contaminants present at the site and surrounding areas represent a potential risk to exposed ecological receptors. Based on the outcome of the ERA, recommendations will be made about the need for additional investigation.

The scope of this ERA encompasses both onsite and offsite habitat that currently exists or may be created as part of future development of the site. Currently, potentially exposed ecological receptors are predominantly in the offsite dune area east of the site, but may also occur to some extent in the maintained areas (e.g., mowed lawn habitats) surrounding the buildings. The City of Waukegan currently has plans, as described in its Lakefront Master Plan to create a city park within and north of the existing building footprint, as well as conservation of the offsite dune area east of the site. Because of these plans, this ERA evaluates both a current use scenario (based upon existing conditions) and a future use scenario (based upon the creation of higher quality habitat as part of the Master Plan) for terrestrial areas on and adjacent to the site.

Impacts to aquatic habitat in the dune area, Lake Michigan, and Waukegan Harbor were not considered in this ERA. Impacts to aquatic habitat in the dune areas (the North and South ditches) are currently being investigated and contaminated sediments will be removed. Although migration to Lake Michigan and Waukegan Harbor are also being considered, remedial actions are expected to reduce offsite contaminant transport and potential impacts would be reduced to very low levels through dilution. Therefore, for this ERA, aquatic habitats were assumed to be not impacted, and risks to aquatic receptors were not considered.

The methods and approaches used in this ERA were developed from applicable USEPA ERA guidance for Region 5 (USEPA 1997a, 1998, 2005a). As described in USEPA ERA guidance (USEPA 1997a, 1998), a Screening-level ERA (SLERA) consists of three main components: (1) problem formulation, (2) analysis, and (3) risk characterization. The screening-level problem formulation (Step 1 of the 8-step ERA process) involves: (1) compiling and reviewing existing information on the habitats and biota potentially present on the site and in the site vicinity; (2) compiling and reviewing available analytical data; (3) developing exposure scenarios; (4) developing an ecological conceptual model that identifies and evaluates potential source areas, transport pathways, fate and transport mechanisms, exposure media, exposure routes, and receptors; and (5) developing assessment and measurement endpoints for all complete exposure pathways.

The two remaining components of the ERA are analysis and risk characterization. At the screening level, the analysis portion of the ERA is divided into two main parts, screening-level effects assessment (the remainder of Step 1) and screening-level exposure assessment (Step 2). The principal activity associated with the screening-level effects assessment is the development of chemical exposure levels that represent conservative thresholds for adverse ecological effects. The screening-level exposure assessment involves estimating potential exposures to ecological receptors for the exposure scenarios identified in the screening-level problem formulation using intentionally conservative assumptions. The principal activity associated with the screening-level exposure assessment is estimating chemical concentrations in applicable media to which the receptors might be exposed based upon maximum (worst case) assumptions.

The screening-level risk calculation (the remainder of Step 2) represents the risk characterization portion of the SLERA and uses the information generated during the two previous parts of the SLERA (problem formulation and analysis) to calculate potential risks to ecological receptors for the exposure scenarios evaluated. Also included is an evaluation of the uncertainties associated with the models, assumptions, and methods used in the SLERA, and their potential effects on the conclusions of the assessment. At the conclusion of Step 2 is a Scientific Management Decision Point (SMDP), at which point four decisions are possible:

- There is enough information to conclude that no unacceptable ecological risks exist, and therefore there is no need for further study or actions to address ecological risk;
- The available information is not adequate to estimate risk or the risk estimate is believed to be too conservative or uncertain for decision-making purposes. The ecological risk assessment process should proceed to the baseline ERA (BERA; Step 3);
- The available information indicates a potential for adverse ecological effects, and a more thorough study is necessary to refine the risk estimates (proceed to Step 3); or
- There is adequate information to conclude that unacceptable ecological risks exist and remedial actions should be considered (presumptive remedy).

If the results of the SLERA suggest that further ecological risk evaluation or data collection is warranted for a particular site, the ERA process would proceed to the BERA, which is a more detailed phase of the ERA process (Steps 3 through 7).

Background and Previous Investigations

OMC Plant 2 has been subject to investigation and remediation (primarily for polychlorinated biphenyls [PCBs]) since the late 1970s. A description of these investigations and remedial actions is described in Section 1. The environmental site investigation of the lakefront adjacent to the site recently conducted by the City of Waukegan (Diegan &

Associates, 2004), and the follow-up environmental assessment of the area by USEPA (Tetra Tech 2005) are particularly relevant to this ERA, and are described below.

The City of Waukegan conducted an environmental investigation of the dune area east of the Plant 2 site to obtain information needed to establish conservation open space, passive recreational use, and natural habitat in the waterfront area. The investigation focused on collecting data needed to determine if existing conditions pose a threat to human health and the environment. PCB concentrations that exceeded the IEPA Tiered Approach to Corrective Action Objectives (TACO) guideline (1 milligram per kilogram [mg/kg]) were found in dune area soil. The soils or sediment with elevated PCB concentrations greater than 1 ppm appears to be mainly to the northwest corner of the study area in the vicinity of the eastern PCB containment cell, the previously remediated North Ditch, and in the South Ditch along the southern border of the study area (see RI Figure 3-11). The City of Waukegan recommended continued restricted public access to these areas until further contaminant removal and/or containment is conducted (Diegan & Associates, 2004).

In response to the discovery of PCB contamination outside the east containment cell, USEPA performed an environmental site assessment that included sampling activities to confirm PCB concentrations and to further refine the extent of contamination. The sampling was conducted in August 2005 and the results, confirmed the City's findings. The concentrations detected will allowed USEPA to conduct response action to remove PCB-contaminated soil. Sediment samples, however, did not confirm elevated PCB concentrations previously observed in the South Ditch. The USEPA concluded additional actions are necessary to address the potential for direct contact with contaminated soils and migration of contaminants to Lake Michigan (Tetra Tech 2005).

Screening-Level Problem Formulation

The screening-level problem formulation establishes the goals, scope, and focus of the SLERA. As part of problem formulation, the environmental setting is characterized in terms of the habitats and biota known to be present. The types and concentrations of chemicals present in ecologically relevant media are also described. A preliminary conceptual model was developed that describes potential sources, potential transport pathways, potential exposure pathways and routes, and potential receptors. Assessment and measurement endpoints were then selected to evaluate those receptors for which complete and potentially critical exposure pathways were likely to exist. The fate, transport, and toxicological properties of the chemicals present, particularly the potential to bioaccumulate, were also considered during this process.

Environmental Setting

The environmental setting of the assessment area, encompassing OMC Plant 2 site and the surrounding areas, was characterized using available information compiled from literature review and existing documents. The characterization of the environmental setting is important to identify the potential receptors (habitats and biota) for the ERA, as well as to identify potentially complete transport and exposure pathways from source areas to these receptors. The major components of the environmental setting are described in the following subsections.

Habitat

The most significant ecological features near the site include Lake Michigan, Waukegan Beach, and the Illinois Beach State Park. The Lake Michigan shoreline, including a portion of Waukegan Beach, is located east of the site. Illinois Beach State Park is located about 1.5 miles north of the site.

Onsite

Onsite terrestrial habitat exists but is limited to maintained/mowed grassy and gravel areas surrounding the building complex and parking lot areas. This habitat is considered low quality. Wetlands or aquatic habitat are not present onsite.

Dune Area

The offsite dune area consists of 13 acres directly east of the OMC Plant 2 site, extending from the North Shore Sanitary District's southern property boundary to the South Ditch. The North Shore Sanitary District's secondary outfall discharges into the North Ditch. Wind and wave action have shifted the drainage pattern of the North Ditch and carved a drainage swale across the northeastern portion of the area to Lake Michigan. A stormwater ditch and former OMC Plant 2 outfall forming the South Ditch is beginning to develop into a wetland area.

The City's environmental site investigation in July 2004 included identifying habitat with the study area (Deigan & Associates 2004). The area is characterized as being a dry sand prairie/foredune community dominated by marram grass, little bluestem grass (*Schizachyrium scoparium*) and sand reed (*Camlamovilfa longifolia*). Forb diversity (number of species and abundance of each species) is quite low with most of the species, often represented by only one or two individuals, occurring along a narrow strip on the west edge of the area. Some depressional areas within the sand prairie/foredune community contain fairly large populations of lake shore rush (*Juncus baltisu littoralis*), suggesting that these areas are near the water table.

Three wetland areas are represented by drainage ditches on the north and south edges of the area and by a small depression along the North Ditch near the lakeshore. A narrow terrace along the north side of the South Ditch contained significant amounts of the following wetland plant species:

- Ohio goldenrod (*Solidago ohiensis*)
- Richardson's rush (J. *alpinus rariflorus*)
- Prairie wedge grass (*Sphenopholis obtusata*)
- Green twayblade orchids (*Liparis loeselii*)

Waukegan Beach

The offsite dune area is part of Waukegan Beach and the Lake Michigan shoreline. Waukegan Beach is a sand and dune area east of the site that is used primarily for recreational purposes (i.e., beachcombing, swimming, picnicking, etc.). The beach extends north along the Lake Michigan shoreline to the Illinois Beach State Park. In the past, the City of Waukegan would periodically grade the beach to enhance recreational opportunities, resulting in a disturbance to the sand dune communities. The City has discontinued grading the beach, allowing the partial redevelopment of the dune communities (CH2M HILL 1995).

Historically, Lake Michigan occupied many portions of the Waukegan Beach area, but has receded over the years and exposed much of the fine to very fine sandy soils. A seawall barrier constructed from large cement and quarried boulders define the western limit of the beach area and former extent of Lake Michigan wave activity. Some of the concrete rubble breakwall adjacent to the Plant 2 site was removed by the City of Waukegan in June 2005.

Waukegan Beach is comprised of two general areas: Waukegan Beach east of OMC Plant 2 and north of the South Ditch, and Waukegan Beach south of the South Ditch and east of Seahorse Drive. Waukegan Beach east of OMC Plant 2 has never been developed with surface structures and is generally inaccessible. Wooded areas have been re-established east of the former seawall barrier and extend from the North Ditch to the South Ditch. Most of the remaining portions of the Waukegan Beach east of this tree line are rolling sand dune with sporadic tree and natural grass land cover that lead eastward to a gently sloping beach.

The southern portion of Waukegan Beach east of Seahorse Drive, especially near the shoreline south of South Ditch, is commonly used by the general public. This portion of Waukegan Beach has been developed with some structures located just east of the parking lot and a seawall barrier extending out into Lake Michigan serving as wave protection for outer portions of Waukegan Harbor.

In general, wetland vegetation communities are scattered throughout the Waukegan Beach area along Lake Michigan and are typically characterized by creeping juniper and nodding wild rye (CH2M HILL 1995).

Lake Michigan

Lake Michigan provides a diverse aquatic habitat and supports a commercial and sport fishery. Yellow perch and bloaters are harvested commercially. The Lake Michigan sport-fishing catch consists primarily of yellow perch; chinook and coho salmon; and steelhead, brown, and lake trout. Two state-threatened fish species, the longnose sucker and the lake whitefish, have been reported in Lake Michigan between Zion and Waukegan. The last sightings of these species were in 1985 for the longnose sucker and in 1991 for the lake whitefish (CH2M HILL 1995).

Waukegan Harbor, a developed embayment of Lake Michigan, is located west and south of the Waukegan Beach area. In the past, fishing advisories were posted at the Waukegan Harbor (based on PCB data from fish sampling), and post-remediation (after 1993) monitoring data indicated contaminant concentrations in fish had decreased (USEPA 2000). Results for carp in 2000 showed PCB concentrations in line with fish samples collected by other Lake Michigan states and the public has been warned not eat carp from Lake Michigan waters of Illinois (USEPA 2003a). Factors that limit Waukegan Harbor’s value as a habitat include regular industrial boat traffic that stirs up and muddies the harbor waters; dredging operations that disturb harbor sediments and affect surface water quality; and the lack of cover provided by the deep, vertical harbor walls (CH2M HILL 1995).

The Illinois Department of Conservation (IDOC) has been stocking salmon and trout into Lake Michigan near Waukegan Harbor since 1957 (CH2M HILL 1995). The stocked fish are released into the harbor area just south of the Waukegan Harbor’s southern breakwater. The salmon and trout migrate back to the release site during spawning season.

Illinois State Beach Park

Illinois Beach State Park is a 4,160-acre natural area situated along the Lake Michigan shore about 1.5 miles north of the site. The park contains a diverse habitat, including cattail marshes, sand prairies, and savannas. An avian ecological survey conducted in 1981 recorded 116 bird species within the park, 91 of which were believed to be nesting within park boundaries (Hickman and Nial 1981). Other animals observed at the park include 28 species of mammals, 14 species of reptiles, and 9 species of amphibians (IDOC 1992). Several threatened and endangered plant and bird species have also been observed at Illinois Beach State Park.

Biota

Biota that may be present at the site, or in the site vicinity, were determined from previous investigations (CH2M HILL 1995; Deigan & Associates 2004), a search the Department of Illinois Habitat Diversity database for species collected from Lake County, and Christmas bird counts for the Waukegan count circle. Amphibians, reptiles, birds, and mammals that may occur in the vicinity of the site are presented in Tables F-1 to F-3.

Amphibians and Reptiles

Amphibian and reptile species that have been observed at Illinois State Beach Park are listed in Table F-1. Not all of the species listed in Table F-1 are likely to occur in the immediate site vicinity, due to habitat preferences.

Birds

To characterize winter bird usage in the site vicinity, the most recent Christmas Bird Count (CBC) data from the site vicinity were collected (NAS 2002). CBCs are 1-day counts conducted annually by the National Audubon Society (NAS) using volunteer observers during the months of December or January within a circle with a diameter of 15 miles. Birds seen or heard are enumerated during these counts. The nearest CBC plot is centered approximately four miles west/southwest of OMC Plant 2.

Table F-2 lists the number of birds, by species, observed during the past 5 years of CBC surveys; a total of 135 species were observed during this period. The most commonly observed bird species during the winter period included the Canada goose, mallard; European starling, herring gull, and American robin. Because this census plot encompasses a much larger area and more diverse habitats, many of the species listed in Table F-2 may not actually occur in the vicinity of the site.

Mammals

Mammalian species observed at Illinois State Beach Park are listed in Table F-3. The mammalian species observed during the surveys were generally typical of those expected based on the geographic area, the time of year, weather conditions, and the habitats present at the park.

Threatened and Endangered Species

The Illinois Department of Natural Resources identified 13 plants species, 1 invertebrate species, and 5 bird species that are threatened or endangered (federal or state) and may be found within 1 mile of OMC Plant 2 (Table F-4; Kieninger 2005). The bird species include the following: Henslow's sparrow (*Ammodramus henslowii*), upland sandpiper (*Bartramia longicauda*), peregrine falcon (*Falco peregrinus*), common tern (*Sterna hirundo*), and the black-crowned night heron (*Nycticorax nycticorax*). IDOC also identified the piping plover (*Charadrius melodius*), ring-billed gull (*Larus delawarensis)*, brewer's blackbird (*Euphagus cyanocephalus*), and yellow-crowned night heron (*Nyctanassa violace*) as threatened, endangered, or rare bird species may have also nested or attempted to nest at Waukegan Beach (CH2M HILL 1995). None of the species are known to nest adjacent to the site. A common tern nesting site is near the Commonwealth Edison Waukegan Power Plant, which is located about 1.5 miles north of the site. This is the only known common tern nesting colony in Illinois (CH2M HILL 1995). Blanding turtle (*Emydoidea blandingii*; state threatened) has also been documented in Illinois State Beach Park.

Four threatened or endangered plant species have been found at Waukegan Beach: American sea rocket (*Cakile edentula*; state-threatened), seaside spurge (*Chamaesyce polygonifolia*; state-endangered), American beachgrass (*Ammophila breviligulata*; state-endangered), and Kalm's St. John's wort (*Hypericum kalmianum*; state-endangered). A naturalist with IDOC has stated that suitable habitat exists for other rare plant species, even though they were not observed during a cursory survey (Barr 1994). Sea rocket and seaside spurge are adapted to sand pocket habitats and are likely to be found only as primary successional species of the upper reaches of a bare sand habitat. Beachgrass (also known as marram grass) may occur as high as the foredune, just beyond the upper reaches of the beach sand habitat, but is not likely to occur further inland, and serves the important function of stabilizing the sand dune (Barr 1994). Beachgrass dominates the area and is found evenly distributed in a near continuous cover across the entire area (Diegan & Associates 2004). Kalm's St. John's wort is represented by six to eight plants located in the southwestern corner of Waukegan Beach east of OMC Plant 2 (Diegan & Associates 2004).

Summary of Available Analytical Data

Existing chemical concentrations in surface soil are characterized in Section 3 of the RI report. Chemical groups detected include metals, PCBs, semivolatile organic compounds (SVOCs; including polynuclear aromatic hydrocarbons [PAHs]), and volatile organic compounds (VOCs). Surface soil summary statistics for detected chemicals in the current use scenario, which includes all soil samples collected outside of the building footprint, are provided in Table F-5. Surface soil samples were defined as those with a starting depth at less than 0.5 foot below ground surface (bgs). The future redevelopment scenario was evaluated using a recreational scenario and includes samples collected within the footprint of the proposed park along the northern section of the site, as well as the offsite dune area east of the site, per the Lakefront Master Plan.

Preliminary Ecological Conceptual Model

The preliminary ecological conceptual model is presented in Figure F-1. The conceptual model was designed to diagrammatically relate potentially exposed receptor populations with potential contaminant source areas based on the physical nature of the site and potential exposure pathways. Important components of a preliminary conceptual model are the identification of potential sources of contaminants, transport pathways, exposure media, potential exposure routes, and potential receptor groups. A complete exposure pathway has three components: (1) a source of chemicals that can be released to the environment; (2) a pathway of contaminant transport through an environmental medium; and (3) an exposure or contact point for an ecological receptor.

Source Areas, Exposure Pathways and Routes, and Exposure Media

The potential source(s) of the chemicals and the pathway of contaminant transport through environmental medium to surface soil onsite and to the offsite dune area are discussed in Section 4 or the RI report. Complete exposure pathways currently exist for terrestrial ecological receptors in these areas (current use scenario) and also potentially exist for terrestrial ecological receptors in onsite areas with created habitat (future use scenario). In both scenarios, terrestrial animals may be exposed to chemicals in soil via direct contact with the soil, incidental ingestion of soil, and ingestion of contaminated food items for chemicals that have entered food webs. Terrestrial vegetation may be exposed to chemicals via direct contact of roots to soils. Exposure to chemicals present in the surface soil via dermal contact may occur but is unlikely to represent a major exposure pathway for upper trophic level receptors because fur or feathers minimize transfer of chemicals across dermal tissue. Direct contact is a potential exposure route for soil invertebrates. Exposure to chemicals through drinking water ingestion was not considered in this ERA because aquatic habitat was not considered impacted for this ERA.

Surface soil data used in the ERA were all data collected with a starting depth of less 0.5 foot bgs (for the future redevelopment scenario, samples were considered representative of surface soil if the starting depth was less than 0.5 foot bgs following removal of the building foundation). In some cases, the bottom depth of these samples extended below exposure depths likely encountered by ecological receptors. The City of Waukegan data collected in the offsite dunes (Diegan & Associates 2004), for example, were taken from 0 to 3 feet bgs. The uncertainty associated with including these sample depths is discussed in the Uncertainties Section.

Although some volatile chemicals may be present in soil, and particulate resuspension may occur, inhalation will not typically represent a significant exposure pathway because the concentrations of volatile compounds in the soil are generally not very high and potential exposures are expected to be low for all receptors, even burrowing wildlife. In addition, the chemical contribution from the inhalation pathway is generally insignificant for upper trophic level ecological receptors relative to ingestion pathways. Hence, the air pathway is not considered for ecological receptors.

Receptor Species

Because of the complexity of natural systems, it is generally not possible to directly assess the potential impacts to all ecological receptors present within an area. Therefore, specific receptor species (e.g., short-tailed shrew) or species groups (e.g., invertebrates) are often selected as surrogates to evaluate potential risks to larger components of the ecological community (guilds, such as carnivorous birds) used to represent the assessment endpoints (e.g., survival and reproduction of carnivorous birds). Selection criteria typically include those species that:

- Are known to occur, or are likely to occur, at the site;
- Have a particular ecological, economic, or aesthetic value;

- Are representative of taxonomic groups, life history traits, and/or trophic levels in the habitats present at the site for which complete exposure pathways are likely to exist; and/or
- Can, because of toxicological sensitivity or potential exposure magnitude, be expected to represent potentially sensitive populations at the site.

The following upper trophic level receptor species were chosen for exposure modeling based upon the criteria listed above, the general guidelines presented in USEPA (1991), and the assessment endpoints discussed in the following subsection:

- Short-tailed shrew (*Blarina brevicauda*) - terrestrial mammalian insectivore
- Meadow vole (*Microtus pennsylvanicus*) – terrestrial mammalian herbivore
- Red fox (*Vulpes vulpes*) - terrestrial mammalian carnivore
- American robin (*Turdus migratorius*) - terrestrial avian insectivore
- Red-tailed hawk (*Buteo jamaicensis*) - terrestrial avian carnivore
- Mourning dove (*Zenaida macroura*) - terrestrial avian herbivore

Lower trophic level receptor species, including threatened and endangered plant species, were evaluated based upon those taxonomic groupings for which medium-specific screening values have been developed; these groupings and screening values are used in most ecological risk assessments. As such, specific species of terrestrial plants and soil invertebrates (earthworms are the standard surrogate) were evaluated using soil screening values developed specifically for these groups. Because terrestrial plant screening values were also intended to be protective of individual threatened and endangered species, the most conservative values (e.g., lowest no observed effect concentration [NOEC]) were selected.

Upper trophic level receptor species quantitatively evaluated in the ERA were limited to birds and mammals (as shown in the preceding list), the taxonomic groups with the most available information regarding exposure and toxicological effects. Individual species of reptiles were not selected for evaluation because of the general lack of available toxicological information for these taxonomic groups from food web exposures. Potential risks to reptiles from exposure via the food web were evaluated using other fauna (birds and mammals) as surrogates. Potential risks to these groups from direct exposures to soil were evaluated using screening values developed for other taxonomic groups (described above).

Assessment and Measurement Endpoints

The conclusion of the problem formulation includes the selection of ecological endpoints, which are based upon the conceptual model. Two types of endpoints, assessment endpoints and measurement end points, are defined as part of the ERA process (USEPA 1992, 1997a, 1998). An assessment endpoint is an explicit expression of the environmental component or value that is to be protected. A measurement endpoint is a measurable ecological characteristic that is related to the component or value chosen as the assessment endpoint. The considerations for selecting assessment and measurement endpoints are summarized in USEPA (1992, 1997a) and discussed in detail in Suter (1989, 1990, 1993).

Endpoints in the ERA define ecological attributes that are to be protected (assessment endpoints) and a measurable characteristic of those attributes (measurement endpoints) that can be used to gauge the degree of impact that has or might occur. Assessment endpoints most often relate to attributes of biological populations or communities, and are intended to focus the risk assessment on particular components of the ecosystem that could be adversely affected by chemicals attributable to the site (USEPA 1997a). Assessment endpoints contain an entity (e.g., shrew population) and an attribute of that entity (e.g., survival rate). Individual assessment endpoints usually encompass a group of species or populations (the receptor) with some common characteristic, such as specific exposure route or contaminant sensitivity, with the receptor then used to represent the assessment endpoint in the risk evaluation.

Assessment and measurement endpoints might involve ecological components from any level of biological organization, from individual organisms to the ecosystem itself (USEPA 1992). Effects on individuals are important for some receptors, such as threatened and/or endangered species; population- and community-level effects are typically more relevant to ecosystems. Population- and community-level effects are usually difficult to evaluate directly without long-term and extensive study. However, measurement endpoint evaluations at the individual level, such as an evaluation of the effects of chemical exposure on reproduction, can be used to predict effects on an assessment endpoint at the population or community level. In addition, use of criteria values designed to protect the majority (e.g., 95 percent) of the components of a community can be useful in evaluating potential community- and/or population-level effects for non-endangered taxa.

Table F-6 summarizes the assessment and measurement endpoints selected for the ERA.

Screening-Level Effects Assessment

Media-Specific Screening Values

Chemical-specific surface soil screening values were developed to evaluate soil flora communities, individual threatened and endangered terrestrial plant species, and soil fauna. Table F-7 lists the soil-based screening values that were used in this ERA. Screening values were first selected from Efroymson et al. (1997a, 1997b) and the ecological soil screening levels (Eco-SSLs) in USEPA (2003b-c, 2005b-g). These sources provide widely accepted screening values for terrestrial plants and soil invertebrates. If screening values were not available in one of these sources, surrogate values were used (for chemicals with similar structure) or additional sources were identified, including USEPA (1999), U.S. Fish and Wildlife Service (USFWS; Beyer 1990), Canadian Council of Ministers of the Environment (CCME 1999), Sverdrup et al. (2001), Dutch Ministry Standards (MHSPE 1994), USEPA Region 5 (USEPA 2003d), and USEPA Region 4 (USEPA 2001). Because soil flora screening values were intended to also be protective of individual threatened and endangered species, the most conservative values listed in these sources were selected, such as target values in MHSPE (1994) and NOECs in Sverdrup et al. (2001). For 25 percent lethal concentrations (LC25) for terrestrial plants and soil invertebrates described in CCME (1999), an uncertainty the value of 100 was applied to most sensitive species' LC25 to derive a chronic NOEC screening value.

Screening values were not identified for calcium, magnesium, potassium, and sodium. These constituents are considered essential macronutrients and are only toxic at extremely high concentrations. Therefore, these constituents were not considered for further evaluation.

Ingestion Screening Values

Ingestion screening values for dietary exposures were derived for each upper trophic level receptor species and bioaccumulating chemical. Only soil-associated constituents with the potential to bioaccumulate were evaluated for exposures via food webs. This list of bioaccumulating constituents is based upon the list provided in Table 4-2 of USEPA (2000). Toxicological information from the literature for wildlife species most closely related to the receptor species was used, where available, but was also supplemented by laboratory studies of non-wildlife species (e.g., laboratory mice) where necessary. The ingestion-based screening values were expressed as milligrams of the chemical per kilogram body weight of the receptor per day (mg/kg-BW/day).

Growth and reproduction were emphasized as toxicological endpoints since they are the most relevant, ecologically, to maintaining viable populations and because they are generally the most studied chronic toxicological endpoints for ecological receptors. If several chronic toxicity studies were available from the literature, the most appropriate study was selected for each receptor species based on study design, study methodology, study duration, study endpoint, and test species.

No observed adverse effect levels (NOAELs) based on growth and reproduction were utilized, where available, as the screening values. When chronic NOAEL values were unavailable, estimates were derived or extrapolated from chronic lowest observed adverse effect levels (LOAELs) using an uncertainty factor of 10 (USEPA 1997a). In addition, when values for chronic toxicity were not available, a subchronic value was converted to a chronic value using an uncertainty factor of 10 (USEPA 1997a). Toxicity studies longer than 90 days or during a critical life stage were considered of chronic duration (USEPA 1997a). Ingestion-based screening values for birds and mammals are summarized in Tables F-8 and F-9, respectively.

Screening-Level Exposure Assessment

Direct Exposure

Maximum detected constituent concentrations in surface soil were used in the SLERA to conservatively estimate potential exposures for the ecological receptors selected to represent the assessment endpoints.

Food Web Exposure

Upper trophic level receptor exposures to constituents in surface soil were determined by estimating the concentration of each constituent in each relevant dietary component. Incidental ingestion of soil was included when calculating the total exposure.

Dietary items for which tissue concentrations were modeled comprised terrestrial plants, soil invertebrates, and small mammals. The methodologies used to derive these tissue concentrations are outlined below. For the screening portion of the ERA, the uptake of constituents from the abiotic media into these food items was based on conservative (e.g., maximum or 90th percentile) bioconcentration factors (BCFs) or bioaccumulation factors (BAFs) from the literature. Default factors of 1.0 were used only where data were unavailable for a constituent in the literature.

Screening Exposure Point Concentrations

Maximum media concentrations were used as exposure point concentrations for exposure estimation and food web modeling in the screening portion of the ERA. Exposure point concentrations (concentrations in plants, soil invertebrates, and small mammal prey items) for terrestrial predators were estimated using bioaccumulation models and maximum measured media concentrations. The methodology and models used to derive these estimates are described below.

Terrestrial Plants

Tissue concentrations in the aboveground vegetative portion of terrestrial plants were estimated by multiplying the maximum surface soil concentration for each constituent by constituent-specific soil-to-plant BCFs obtained from the Bechtel Jacobs (1998) and USEPA (2005h). For organic constituents without chemical specific BCFs identified in USEPA (2005h), a BCF was estimated from the log K_{ow} using the equation provided in USEPA (2005h). The log K_{ow} values used in the calculations were obtained from Jones et al. (1997) and are listed in Table F-10. The BCF values used were based on root uptake from soil and on the ratio between dry-weight soil and dry-weight plant tissue. Literature values based on the ratio between dry-weight soil and wet-weight plant tissue were converted to a dry-weight basis by dividing the wet-weight BCF by the estimated solids content for plants (15 percent [0.15]; Sample et al. 1997). The soil-to-plant BCFs used in the screening portion of the ERA are shown in Table F-10.

Earthworms

Tissue concentrations in soil invertebrates (earthworms) were estimated by multiplying the maximum surface soil concentration for each constituent by constituent-specific BCFs or BAFs obtained from the literature. BCFs are calculated by dividing the concentration of a constituent in the tissues of an organism by the concentration of that same constituent in the surrounding environmental medium (in this case, soil) without accounting for uptake via the diet. BAFs consider both direct exposure to soil and exposure via the diet. Because earthworms consume soil, BAFs are more appropriate values and are used in the food web models when available. BAFs based on depurated analyses (soil was purged from the gut of the earthworm prior to analysis) are given preference over undepurated analyses when selecting BAF values because direct ingestion of soil is accounted for separately in the food web model.

The BCF/BAF values used were based on the ratio between dry-weight soil and dry-weight earthworm tissue. Literature values based on the ratio between dry-weight soil and wet-weight earthworm tissue were converted to a dry-weight basis by dividing the wet-weight BCF/BAF by the estimated solids content for earthworms (16 percent [0.16]; USEPA 1993). For constituents without available measured BAFs or BCFs, an earthworm BAF of 1.0 was assumed. The soil-to-earthworm BCFs/BAFs used in the screening portion of the ERA are shown in Table F-10.

Small Mammals

Whole-body tissue concentrations in small mammals (shrews and voles) were estimated using one of two methodologies. For constituents with literature-based soil-to-small mammal BAFs, the small mammal tissue concentration was calculated by multiplying the maximum surface soil concentration for each constituent by a constituent-specific soil-to-small mammal BAF obtained from the literature. The BAF values used were based on the ratio between dry-weight soil and whole-body dry-weight tissue. Literature values based on the ratio between dry-weight soil and wet-weight tissue were converted to a dry-weight basis by dividing the wet-weight BAF by the estimated solids content for small mammals (32 percent [0.32]; USEPA 1993). BAFs for shrews are those reported in Sample et al. (1998b) for insectivores (or for general small mammals if insectivore values were unavailable) and for voles are those reported for herbivores. The soil-to-small mammal BAFs are shown in Table F-10.

For constituents without soil-to-small mammal BAF values, an alternate approach was used to estimate whole-body tissue concentrations. Because most constituent exposures for these small mammals is via the diet, it was assumed that the concentration of each constituent in the small mammal's tissues is equal to the constituent concentration in its diet, that is, a diet to whole-body BAF (wet-weight basis) of one was assumed. The use of a diet to whole-body BAF of one is likely to result in a conservative estimate of constituent concentrations for constituents that are not known to biomagnify in terrestrial food webs (e.g., PAHs) based on reported literature values for constituents that are known to biomagnify in food webs. For example, a maximum BAF (wet-weight) value of 1.0 was reported by Simmons and McKee (1992) for PCBs based on laboratory studies with white-footed mice. Menzie et al. (1992) reported BAF values (wet-weight) for DDT of 0.3 for voles and 0.2 for short-tailed shrews. Reported BAF (wet-weight) values for dioxin were only slightly above one (1.4) for the deer mouse (USEPA 1990). Resulting tissue concentrations (wet-weight) were converted to a dry-weight basis using an estimated solids content of 32 percent (see above).

Exposure point concentrations in dietary items are presented in Table F-11.

Dietary Intakes

Dietary intakes for each receptor species were calculated using the following formula (modified from USEPA 1993):

$$DI_x = \frac{[\sum_i (FIR)(FC_{xi})(PDF_i)] + [(FIR)(SC_x)(PDS)]}{BW}$$

where: DI_x = Dietary intake for constituent x (mg constituent/kg body weight/day)

FIR = Food ingestion rate (kg/day, dry-weight)

FC_{xi} = Concentration of constituent x in food item i (mg/kg, dry-weight)

PDF_i = Proportion of diet composed of food item i (dry-weight basis)

SC_x = Concentration of constituent x in soil (mg/kg, dry-weight)

PDS	=	Proportion of diet composed of soil (dry-weight basis)
BW	=	Body weight (kg, wet weight)

Receptor-specific values used as inputs to this equation for the screening portion of the ERA are provided in Table F-12. An example food web exposure calculation is shown for the short-tailed shrew and arsenic in Table F-13. Consistent with the conservative approach used for a SLERA, the minimum body weight and maximum food ingestion rate from the scientific literature were used for each receptor. Diets were also assumed to be based on a single food type (diets composed of small mammals were assumed to consist of both voles and shrews equally). It was assumed that constituents were 100 percent bioavailable to the receptor and it was also assumed that each receptor spent 100 percent of its time on the site (i.e., an area use factor [AUF] of 1.0 was assumed).

Screening-Level Risk Calculation

The screening-level risk calculation is the final step in a SLERA. In this step, the maximum exposure concentrations in soil or exposure doses (upper trophic level receptor species) were compared with the corresponding screening values to derive screening risk estimates. The outcome of this step is a list of constituents of potential ecological concern (COPECs) for each medium-pathway-receptor combination evaluated or a conclusion of acceptable risk.

COPECs are selected using the hazard quotient (HQ) method. HQs are calculated by dividing the constituent concentration in the medium being evaluated by the corresponding medium-specific screening value or by dividing the exposure dose by the corresponding ingestion screening value. In accordance with the guidance followed for this SLERA, constituents with HQs greater than or equal to 1.0 are considered COPECs.

HQs equaling or exceeding 1.0 indicate the potential for risk because the constituent concentration or dose (exposure) equals or exceeds the screening value (effect). However, screening values and exposure estimates are derived using intentionally conservative assumptions in the SLERA such that HQs greater than or equal to 1.0 do not necessarily indicate that risks are present or impacts are occurring. Rather, it identifies constituent-pathway-receptor combinations requiring further evaluation. HQs that are less than 1.0 indicate that risks are very unlikely, enabling a conclusion of no unacceptable risk to be reached with high confidence.

Two sets of risk calculations were performed, direct exposure (lower trophic level receptors) and food web exposure (upper trophic level receptors) , for both the current use and future redevelopment scenarios.

Direct Exposure

Maximum surface soil concentrations for the current use scenario are compared to screening values in Table F-14. Based upon this comparison, total chromium, iron, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), 16 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene), and trichloroethylene had

HQs equaling or exceeding one for soil flora and were identified as COPECs. Soil flora screening values were not available for carbazole and dibenzofuran. Therefore, these chemicals were also retained as COPECs. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), and 17 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, acenaphthene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, carbazole, dibenzofuran, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding one and were identified as COPECs.

Maximum surface soil concentrations for the future redevelopment scenario are compared to screening values in Table F-15. Based upon this comparison, total chromium, iron, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), 16 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene), and trichloroethylene had HQs equaling or exceeding 1.0 for soil flora and were identified as COPECs. Soil flora screening values were also not available for benzaldehyde, carbazole, and dibenzofuran. Therefore, these chemicals were also retained as COPECs. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), and six SVOCs (2-methylnaphthalene, bis[2-ethylhexyl]phthalate, fluoranthene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding 1.0 and were identified as COPECs. A soil fauna screening value was also not available for benzaldehyde. Therefore, this chemical was also retained as a COPEC.

Food Web Exposure

Hazard quotients based upon maximum exposure doses for the current use scenario and each upper trophic level receptor species are summarized in Table F-16. Based upon a comparison to NOAELs, arsenic (short-tailed shrew and meadow vole), chromium (short-tailed shrew and American robin), zinc (American robin), PCBs (PCB-1248, PCB-1254, and PCB-1260 for all receptors), benzo[a]anthracene (short-tailed shrew), benzo[a]pyrene, (short-tailed shrew), benzo[b]fluoranthene (short-tailed shrew and meadow vole), benzo[g,h,i]perylene (short-tailed shrew and meadow vole), benzo[k]fluoranthene (short-tailed shrew), dibenz[a,h]anthracene (short-tailed shrew), fluoranthene (mourning dove), indeno[1,2,3-cd]pyrene (short-tailed shrew), and pyrene (short-tailed shrew, meadow vole, red fox, and mourning dove) had HQs greater than or equal to 1.0 and were identified as COPECs.

Hazard quotients based upon maximum exposure doses for the future redevelopment scenario and each upper trophic level receptor species are summarized in Table F-17. Based upon a comparison to NOAELs, arsenic (short-tailed shrew and meadow vole), chromium (short-tailed shrew and American robin), zinc (American robin), PCBs (PCB-1248, PCB-1254, and PCB-1260 for all receptors), benzo[a]pyrene, (short-tailed shrew), benzo[b]fluoranthene (short-tailed shrew), indeno[1,2,3-cd]pyrene (short-tailed shrew), and pyrene (short-tailed shrew) had HQs greater than or equal to 1.0 and were identified as COPECs.

Scientific Management Decision Point

Upon completion of the SLERA, several COPECs were identified in surface soils for both the current and future redevelopment risk scenarios. This point in the ERA process represents an SMDP. Because the risk estimate is believed to be too conservative or uncertain for decision-making purposes, the ecological risk assessment process should proceed to the BERA (Step 3). The first part of Step 3 involves refining the assumptions and methods used in the SLERA to be more realistic to actual ecological receptor exposure and potential effects conditions.

Baseline Problem Formulation (Step 3)

The SLERA resulted in a set of COPECs for surface soil for both the current and future redevelopment risk scenarios. This set of COPECs includes constituents with HQs greater than or equal to 1.0 (based upon maximum exposures) and detected constituents for which screening values were not available.

Refinement of Conservative Screening Assumptions

According to Superfund guidance (USEPA 1997a), Step 3 initiates the problem formulation phase of the BERA. In the initial step of the BERA, the COPECs from the SLERA were reexamined based upon more realistic exposure assumptions to determine if they truly pose a potential risk and decisions were made about whether or not some or all of the COPECs should be eliminated from further consideration. In this initial refinement of the COPECs, the conservative assumptions employed in the SLERA are refined and risk estimates are recalculated using the same conceptual model for the site.

The assumptions, parameter values, and methods that were modified for the Step 3 refinement included:

- Risk estimates based on maximum constituent concentrations were supplemented by risk estimates based on average (arithmetic mean) constituent concentrations.
- BAFs and BCFs were based upon, or modeled from, central tendency estimates (e.g., median or mean) from the literature as opposed to the maximum or "high-end" (e.g., 90th percentile) estimates used in the SLERA for many constituents. Revised BAF/BCF values used in the Step 3 refinement are provided in Table F-18. Revised exposure point concentrations in dietary items are presented in Table F-19.

  In the BERA, using central tendency estimates (rather than high end or maximums) for exposure parameters such as BAFs provides a more representative estimate of potential exposures and risks to receptor populations (the focus of the assessment endpoints) of upper trophic level receptors. Because these upper trophic level species are highly mobile, they would be expected to effectively average their exposure over time as they forage within the area defining their home range (which will extend to uncontaminated offsite areas). Average prey concentrations are most appropriately estimated using central tendency estimates of media concentrations and accumulation factors. For example, the wildlife dietary exposure models contained in the *Wildlife Exposure Factors Handbook* (USEPA 1993) specify the calculation of an average daily dose. Increasing the representativeness of the exposure estimates relative to population-level effects is consistent with the intent of the Step 3 refinement. In cases where adequate spatial sampling coverage exists, mean concentrations are also appropriate for evaluating potential risks to populations of lower trophic level receptors, except threatened and endangered species, because the members of the population are expected to be found throughout a site (where suitable habitat is present), rather than concentrated in one particular area. While effects on individual organisms might be important for some receptors, such as rare and endangered plant species, population- and community-level effects are typically more relevant to ecosystems.

- Central tendency estimates (e.g., mean, median, or midpoint) for body weight and ingestion rate (Table F-20) were used to develop exposure estimates for upper trophic level receptors, rather than the minimum body weights and maximum ingestion rates used in the SLERA. Central tendency estimates for these exposure parameters are more relevant for a BERA because they better represent the characteristics of a greater proportion of the individuals in the population. Populations (rather than individual organisms) were emphasized during the development of the assessment endpoints for the ERA.
- In addition to the NOAELs used in the SLERA, consideration is given to risk estimates based upon LOAELs for upper trophic level receptors. The actual dose that is protective of an individual receptor, however, will fall between the NOAEL and the LOAEL. Both the NOAEL and LOAEL were used for comparison in the BERA.
- Onsite and offsite concentrations of metals were compared to Illinois statewide background concentrations for counties within municipalities. Concentrations below statewide background levels are unlikely to impact the assessment endpoints evaluated in this ERA.
- The frequency of detection, the spatial distribution of exceedances, and the association of exceedances with habitat quality and areas with ongoing remedial activities were also considered in the evaluation of COPECs. COPECs that have no or few exceedances in suitable habitat or that were spatially isolated were not considered to have population-level impacts. Exceedances were also evaluated spatially to assess impacts to threatened and endangered plant species.

Only COPECs and receptors identified in the SLERA as requiring further evaluation were addressed in the Step 3 refinement. Although some aspects of the estimation of exposure were modified in the Step 3 refinement (see above) the screening values (effects), except the additional consideration of LOAELs, used in the Step 3 refinement were the same as the values used in the SLERA.

Refined Risk Characterization

The following subsections summarize the results of the Step 3 refinement.

Direct Exposure

Mean chemical concentrations in surface soil for the current use scenario were compared with soil screening values in Table F-21. Based upon this comparison, total chromium, iron, vanadium, and 16 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding 1.0 for soil flora. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260), bis(2-ethylhexyl)phthalate, and naphthalene had HQs equaling or exceeding 1.0. Chemicals that had HQs equaling or exceeding 1.0 or were without screening values were retained as refined COPECs.

Mean chemical concentrations in surface soil for the future redevelopment scenario were compared with soil screening values in Table F-22. Based upon this comparison, total chromium, iron, vanadium, and 15 SVOCs (1-benzphenanthrene, 2-methylnaphthalene, anthracene, benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, bis[2-ethylhexyl]phthalate, dibenz[a,h]anthracene, fluoranthene, indeno[1,2,3-cd]pyrene, naphthalene, phenanthrene, and pyrene) had HQs equaling or exceeding 1.0 for soil flora. For soil fauna, total chromium, iron, manganese, vanadium, PCBs (PCB-1248, PCB-1254, and PCB-1260) and bis(2-ethylhexyl)phthalate had HQs equaling or exceeding 1.0. Chemicals that had HQs equaling or exceeding 1.0 or were without screening values were retained as refined COPECs.

Food Web Exposure

HQs based upon mean exposure doses for the current use scenario and each upper trophic level receptor species are summarized in Table F-23. HQs for PCBs (PCB-1248, PCB-1254, and PCB-1260), based upon the LOAEL, exceeded one for the shrew. HQs for PCB-1248 based upon a comparison to the NOAEL exceeded one for the meadow vole, red fox, and American robin, although the HQs based upon the LOAEL were less than 1.0. HQs for PCB-1254 and PCB-1260 based upon a comparison to the NOAEL also exceeded 1.0 for the American robin, although the HQs based upon the LOAEL were less than 1.0.

HQs based upon mean exposure doses for the future redevelopment scenario and each upper trophic level receptor species are summarized in Table F-24. HQs for PCBs (PCB-1248, PCB-1254, and PCB-1260), based upon the LOAEL, exceeded 1.0 for the shrew. HQs for PCB-1248 based upon a comparison to the NOAEL exceeded 1.0 for the meadow vole, red fox, and American robin, although the HQs based upon the LOAEL were less than 1.0. HQs for PCB-1254 and PCB-1260 based upon a comparison to the NOAEL also exceeded 1.0 for the American robin, although the HQs based upon the LOAEL were less than 1.0.

Risk Evaluation

The potential for adverse effects associated with the refined COPECs from the Step 3 refinement are evaluated in this section.

Current Use Scenario

In the current use scenario, based upon mean concentrations, metals and SVOCs had HQs equaling or exceeding 1.0 for soil flora, and metals, SVOCs, and PCBs (PCB-1248, PCB-1254, and PCB-1260) had HQs equaling or exceeding 1.0 for soil fauna. In addition, two detected

SVOCs (carbazole and dibenzofuran) could not be evaluated because screening values were not available for plants. For birds and mammals, HQs for PCBs exceeded one for the short-tailed shrew, meadow vole, red fox, and American robin, although estimated food web exposure doses exceeded LOAEL-based ingestion screening values only for the shrew. Because LOAEL-based ingestion screening values were not exceeded by exposure doses for all receptors except the shrew and PCBs, population-level impacts to upper-trophic level receptors (the assessment endpoint evaluated) are unlikely, and further investigation is not needed.

An evaluation of metal concentrations that exceeded screening values indicates that they are relatively ubiquitous and at concentrations below background and adverse effect levels. Maximum and average concentrations of aluminum, chromium, iron, manganese, and vanadium for the current use scenario and the future redevelopment scenario were compared to background Illinois statewide background concentrations for counties within municipalities in Table F-25. Maximum and average concentrations did not exceed background concentrations.

Total chromium was detected at all locations in the offsite dunes (range of 2.4 to 10 mg/kg). The screening values for chromium were derived by Efroymsen et al. (1997a-b), and low confidence was placed on these values because of the small number of studies on which they were based. No effects were also observed at concentrations in studies evaluated by Efroymsen et al. above those observed at the site. Because total chromium concentrations were below state-wide background levels, actual effect levels are uncertain, no injury was observed at the site, and the total chromium exposure doses for upper-trophic level receptors were below screening values based on only the more toxic hexavelent form, no further investigation of chromium is necessary.

As stated in the Eco-SSL for iron (USEPA 2003c), specific concentrations of iron likely to cause adverse effects are not available. A pH guideline was used that describes the form of iron likely to be present. Because the average pH in the offsite dunes is above 8 and the sand is well-aerated, the insoluble ferric form of iron is more likely present, indicated decreased iron availability to plants. Under extreme conditions, this may result in iron deficiency to plants. Because the receptors at the site are assumed to be adapted to ambient conditions, the concentrations were below state-wide background levels, and no injury was observed at the site, no further investigation of iron is necessary.

Manganese was detected at all locations in the offsite dunes (range of 75 to 270 mg/kg). The manganese screening value is based on effects to soil microflora, and low confidence was placed on this value because of the small number of studies on which it was based. No effects were also observed at concentrations in studies evaluated by Efroymsen et al. above those observed at the site. While soil microflora are important components of the ecosystem, effects on soil invertebrate populations was the assessment endpoint evaluated in this ERA. In a study by Kuperman et al. (2003), earthworm, enchytraeid, and collembolan reproductive EC20s were estimated at 116 mg/kg, 629 mg/kg, and 1,209 mg/kg, respectively. Although collembolans are more likely to present in the sandy off-site dunes, only three samples (S-01, S-02, and S-04) had concentrations that slightly exceeded the lowest (earthworm) EC20. Because manganese concentrations were below state-wide background levels, only a limited area of impact exists, if any, that is unlikely to affect populations of soil invertebrates (the assessment endpoint evaluated), and no injury was observed at the site, no further investigation of manganese is necessary.

Vanadium was detected at all locations in the offsite dunes (range of 5.3 to 13 mg/kg). The screening value is based on effects to plants from a single study, and confidence in the benchmark is low (Efroymsen et al. 1997a). Because vanadium concentrations were below state-wide background levels, actual effect levels are uncertain, and no injury was observed at the site, no further investigation of vanadium is necessary.

An evaluation of the spatial distribution of SVOCs and PCBs in surface soil that exceeded screening values, as well as carbazole and dibenzofuran, suggests a spatially limited area of potential risks, with most exceedances in onsite areas that have low quality habitat. The onsite terrestrial habitat consists of maintained/mowed grassy and gravel areas surrounding the building complex and parking lot areas, and does not currently provide habitat for threatened and endangered plant species. The magnitude of the exceedances was also below a factor of 10 for all chemicals except 2-methylnaphthalene and naphthalene, which suggests only low to moderate levels of risk when it is considered that these exceedances are based on conservative screening values and suitable habitat is assumed to exist. If an uncertainty factor of 10 is applied to the conservative screening values to derive less-conservative screening values (analogous to NOAEL to LOAEL uncertainty factor of 10), there would be few exceedances and risks would be considered low. The screening values for 2-methylnaphthalene and naphthalene are based on concentrations equal to 25 percent reduction in seedling emergence and earthworm mortality with an uncertainty factor of 100 applied and are therefore considered very conservative. For the short-tailed shrew, although exposure doses for PCBs exceed screening values based on LOAELs, the onsite area is expected to contribute little to the total exposure dose as this area is fragmented and more suitable contiguous habitat exists in the adjacent offsite dune area.

In the offsite dune area, sample concentrations of PCBs exceeded screening values for soil flora, soil fauna, and the short-tailed shrew. Concentrations of all SVOCs, except bis(2-ethylhexyl)phthalate, did not exceed screening values in the offsite dune area. The highest concentrations of PCBs are in the northwest corner of the dune area, and directly adjacent to the east containment cell. These areas were identified by Diegan & Associates (2004) and were further delineated by USEPA (Tetra Tech 2005). USEPA has determined that an area with PCB concentrations greater than 10 mg/kg in surface soil be removed to a depth of 2 feet and replaced with clean soil containing less than 1 part per million (ppm) PCBs. Following these removal activities, PCB screening values for soil flora, soil fauna, and the short-tailed shrew will not be exceeded. Thus, currently recommended remedial efforts, when implemented, are expected to reduce risk from PCBs to acceptable levels.

Risks from bis(2-ethylhexyl)phthalate, that had sample locations that exceeded screening values in the dune area, dibenzofuran, that was detected in the dune area but had no screening value, and carbazole, that was not detected in the dune area, are considered negligible. The screening values for bis(2-ethylhexyl)phthalate (100 micrograms per kilogram [µg/kg]), which is a target value for total phthalates from MHSPE (1994), is considered very conservative. An additional value (60 mg/kg) is also listed for total phthalates which represents levels considered seriously contaminated. This value is nearly two orders of magnitude greater than the maximum concentration observed in the offsite dune area (0.77 mg/kg). Thus, these low concentrations are unlikely to impact ecological receptors. Dibenzofuran was detected at only one location at low levels (5.9 µg/kg). This limited spatial extent is also unlikely to impact ecological receptors. Because carbazole was only detected in onsite areas with low quality habitat, concentrations are unlikely to impact ecological receptors.

Although the onsite areas have concentrations of SVOCs and PCBs that, if associated with higher quality habitat, could pose potential risks to soil flora, soil fauna, and/or mammalian insectivores, the low quality of the habitat limits potential exposure and thus adverse effects. Risks in the onsite areas are therefore considered low under current conditions. Higher quality habitat is found in the offsite dune areas east of the site, where ongoing remedial efforts will reduce risk from PCBs to acceptable levels. Based on this evaluation of current risks to ecological receptors, no further investigation is necessary.

Future Redevelopment Scenario

The results of the future redevelopment scenario are similar to that for the current use scenario except that higher quality habitat could be created in onsite areas. As noted for the current use scenario, ongoing remedial efforts are expected to reduce risk to acceptable levels that require no future investigation in the offsite dune areas. In the onsite areas, there are potential risks from PCBs and SVOCs if habitat is created in areas with high surface soil concentrations.

For PCBs although area-wide average concentrations do not exceed terrestrial plant screening values, there is the potential for colonization of the created habitat by threatened and endangered species, which should be protected at the individual level, through dispersal from the nearby areas. Because estimated food web exposure doses of metals, PCBs, and SVOCs do not exceed LOAEL-based ingestion screening values for all receptors except the short-tailed shrew, population-level impacts to these receptors (the assessment endpoint evaluated) are unlikely. For small insectivorous mammals such as the short-tailed shrew, there are potential risks from PCBs if habitat is created in areas with high concentrations in the surface soil.

Potential onsite risks to these receptors in the future scenario can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for any “hot spots” that remain.

Summary

Based on the COPEC evaluation using more realistic exposure assumptions, potential risks to ecological receptors currently exist from PCBs in an isolated area in the offsite dune area and in a future redevelopment scenario with created habitat in areas with high concentrations of SVOCs and PCBs. Following PCB removal activities, risks to all receptors are considered acceptable, and no further investigation is required. No other COPEC identified in the conservative Step 2 evaluation was considered to pose a risk to ecological receptors following the COPEC Refinement, and no further investigation is warranted.

In the future redevelopment scenario, soil flora, including threatened and endangered plant species that may colonize created habitat, soil fauna, and small mammal screening values were exceeded by average concentrations of SVOCs and PAHs, indicating potential risks if suitable habitat is created in these areas and the soil concentrations are reflective of post-development conditions. Potential onsite risks to ecological receptors in the future redevelopment scenario can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for any "hot spots" that remain.

Uncertainty Analysis

Uncertainties are present in all risk assessments because of the limitations of the available data and the need to make certain assumptions and extrapolations based on incomplete information. The uncertainty in this ERA is mainly attributable to the following factors:

- <u>Surface Soil Sample Depths</u> – Surface soil data used in the ERA were all data collected with a starting depth of less 0.5 foot bgs (for the future redevelopment scenario, samples were considered representative of surface soil if the starting depth was less than 0.5 foot bgs following removal of the building foundation). In some cases, the bottom depth of these samples extended below exposure depths likely encountered by ecological receptors. The City of Waukegan data collected in the off-site dunes (Diegan & Associates 2004), for example, were taken from 0 to 3 feet bgs. Ecological receptors are typically exposed to surface soil from only 0 to 6 inches. Risks based on soil samples that include soil below 6 inches may overestimate or underestimate risk if subsurface concentrations are higher or lower, respectively, than surface concentrations. In the offsite dune area, for example, risks from PCBs may be slightly underestimated because overland transport of contaminants may be the primary transport pathway and, as a result subsurface concentrations are slightly lower than surface concentrations.

- <u>Soil Flora Screening Values</u> – Soil flora screening values were intended to be protective of both terrestrial plant communities and individual threatened and endangered plant species in the offsite dune area. The uncertainties associated with this approach were minimized by first selecting screening values from Efroymson et al. (1997a) and the Eco-SSLs in USEPA (2005b through 2005g), which are widely accepted screening values for terrestrial plants and were considered protective of both receptors, then by selecting the most conservative values listed in additional sources, such as target values in MHSPE (1994) and NOECs in Sverdrup et al. (2001). The use of conservative screening values could result in an overestimation of potential risk, especially in the evaluation of terrestrial plant communities.

- <u>Ingestion Screening Values</u> - Data on the toxicity of many constituents to the receptor species were sparse or lacking, requiring the extrapolation of data from other wildlife species or from laboratory studies with nonwildlife species. This is a typical limitation and extrapolation for ecological risk assessments because so few wildlife species have been tested directly for most constituents. The uncertainties associated with toxicity extrapolation were minimized through the selection of the most appropriate test species for which suitable toxicity data were available. The factors considered in selecting a test species to represent a receptor species included taxonomic relatedness, trophic level, foraging method, and similarity of diet.

A second uncertainty related to the derivation of ingestion screening values applies to metals. Most of the toxicological studies on which the ingestion screening values for metals were based used forms of the metal (such as salts) that have high water solubility and high bioavailability to receptors. Because the analytical samples on which site-specific exposure estimates were based measured total metal, regardless of form, and these highly bioavailable forms are expected to compose only a fraction of the total metal concentration, this is likely to result in an overestimation of potential risks for these constituents.

A third source of uncertainty associated with the derivation of ingestion screening values concerns the use of uncertainty factors. For example, NOAELs were extrapolated to LOAELs using an uncertainty factor of 10. This approach is likely to be conservative because Dourson and Stara (1983) determined that 96 percent of the constituents included in a data review had LOAEL/NOAEL ratios of 5 or less. The use of an uncertainty factor of 10, although potentially conservative, also serves to counter some of the uncertainty associated with interspecies extrapolations, for which a specific uncertainty factor was not used.

- <u>Constituent Mixtures</u> - Information on the ecotoxicological effects of constituent interactions is generally lacking, which required (as is standard for ecological risk assessments) that the constituents be evaluated on a constituent-by-constituent basis during the comparison to screening values. This could result in an underestimation of risk (if there are additive or synergistic effects among constituents) or an overestimation of risks (if there are antagonistic effects among constituents).

- <u>Receptor Species Selection</u> - Reptiles were selected as receptors in the ERA, but were not evaluated quantitatively even when exposure pathways were likely to be complete. Reptiles were evaluated using other fauna (birds and mammals) as surrogates due to the general lack of taxon-specific toxicological data for food-web (ingestion) exposures.

  It was also assumed that reptiles were not exposed to significantly higher concentrations of COPECs and were not more sensitive to COPECs than other receptor species evaluated in the risk assessment. In addition, there is some uncertainty associated with the use of specific receptor species to represent larger groups of organisms (e.g., guilds).

- <u>Food Web Exposure Modeling</u> - Constituent concentrations in terrestrial food items (plants, earthworms, and small mammals) were modeled from measured soil concentrations and were not directly measured. The use of generic, literature-derived exposure models and bioaccumulation factors introduces some uncertainty into the resulting estimates. The values selected and methodology employed were intended to provide a conservative (SLERA) or reasonable (Step 3) estimate of potential food web exposure concentrations.

- <u>Area Use Factors</u> – Area use factors were assumed to equal one. This is a conservative assumption because a significant percentage of each upper trophic level receptor species' time could be spent foraging offsite in unimpacted areas or areas where constituent concentrations are expected to be significantly lower.

- Mean Versus Maximum Media Concentrations - As is typical in an ERA, a finite number of samples of environmental media are used to develop the exposure estimates. The maximum measured concentration provides a conservative estimate for immobile biota or those with a limited home range. The most realistic exposure estimates for mobile species with relatively large home ranges and for species populations (even those that are immobile or have limited home ranges) are those based on the mean constituent concentrations in each medium to which these receptors are exposed. This is reflected in the wildlife dietary exposure models contained in the *Wildlife Exposure Factors Handbook* (USEPA 1993), which specify the use of mean media concentrations. Given the mobility of the upper trophic level receptor species used in the ERA, the use of maximum constituent concentrations (rather than mean concentrations) in the SLERA to estimate the exposure via food webs is very conservative. This conservatism was reduced to more realistic levels in the values selected for use in the Step 3 evaluation.

- Spatial Distribution of Samples - While unlikely, there is always the possibility that isolated pockets of higher COPEC concentrations were not detected due to the selection of sampling locations (number and spatial distribution). For PCBs, the USEPA (2005a) has attempted to delineate offsite concentrations of PCBs both horizontally and vertically to minimize this possibility. Based on the existing data, the number and spatial distribution of surface soil samples was considered sufficient to adequately estimate ecological risks.

Ecological Risk Assessment Conclusions

Based on the evaluation contained in this ERA using conservative and more realistic exposure assumptions, potential risks to ecological receptors currently exist in an isolated area in the offsite dune area and in a future redevelopment scenario with created habitat in areas with high concentrations of SVOCs and PCBs. In the offsite dune area, an evaluation of the spatial distribution of PCBs in surface soil indicates a limited area associated with potential risks to soil flora, including threatened and endangered plant species, soil fauna, and small insectivorous mammals. However, USEPA has determined that an area with PCB concentrations greater than 10 mg/kg in surface soil be removed to 0 to 2 feet bgs and replaced with clean soil containing less than 1 ppm PCBs. Following these removal activities, risks to these receptors are considered acceptable, and no further investigation is required.

In the future redevelopment scenario, soil flora, including threatened and endangered plant species that may colonize created habitat, soil fauna, and small mammal screening values were exceeded by average concentrations of SVOCs and PAHs, indicating potential risks if suitable habitat is created in these areas and the soil concentrations are reflective of post-development conditions. Potential onsite risks to ecological receptors in the future redevelopment scenario can be minimized by several methods, including creating habitat in areas without elevated concentrations and by creating habitat on clean soil cover. However, because it is expected that the site will be significantly altered during the redevelopment, post-demolition conditions should first be characterized and soil removal should be considered for the remaining areas with concentrations exceeding the remedial action goals developed for the site.

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TABLE F-1
Amphibian and Reptile Species Observed at Illinois State Beach Park
OMC Plant 2

Common Name	Scientific Name
Amphibians	
Northern cricket frog	*Acris crepitans*
Eastern tiger salamander	*Ambystoma tigrinum*
American toad	*Bufo americanus*
Fowler's toad	*Bufo fowleri*
Spring peeper	*Pseudacris crucifer*
Western chorus frog	*Pseudacris triseriata*
Green frog	*Rana clamitans*
Pickerel frog	*Rana palustris*
Northern leopard frog	*Rana pipiens*
Reptiles	
Snapping turtle	*Chelydra serpentina*
Painted turtle	*Chrysemys picta*
Fox snake	*Elaphe vulpina*
Blanding's turtle	*Emydoidea blandingii*
Eastern hognose snake	*Heterodon platirhinos*
Eastern mud turtle	*Kinosternon subrubrum*
Eastern milk snake	*Lampropeltis calligaster*
Northern water snake	*Nerodia sipedon*
Smooth green snake	*Opheodrys vernalis*
Musk turtle	*Sternotherus odoratus*
Northern brown (DeKay's) snake	*Storeria dekayi*
Plains garter snake	*Thamnophis radix*
Chicago garter (Eastern subspecies) snake	*Thamnophis sirtalis semifasciatus*
Eastern garter snake	*Thamnophis sirtalis sirtalis*

TABLE F-2
Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years
OMC Plant 2

Common Name	Scientific Name	1999-2000 Number	1999-2000 Number / Party Hr.	2000-2001 Number	2000-2001 Number / Party Hr.	2002-2003 Number	2002-2003 Number / Party Hr.	2003-2004 Number	2003-2004 Number / Party Hr.	2004-2005 Number	2004-2005 Number / Party Hr.	2005-2006 Number	2005-2006 Number / Party Hr.
Accipiter sp.	*Accipiter*	4	0.0384					10	0.117				
Cooper's Hawk	*Accipiter cooperii*	3	0.0288	7	0.1	5	0.0592	5	0.0585	4	0.0494	3	0.0366
Sharp-shinned Hawk	*Accipiter striatus*	4	0.0384	6	0.0857			1	0.0117	3	0.037		
Red-winged Blackbird	*Agelaius phoeniceus*	429	4.1151	52	0.7429	106	1.2544	121	1.4152	526	6.4938	182	2.2195
Wood Duck	*Aix sponsa*	2	0.0192			1	0.0118			1	0.0123	3	0.0366
Le Conte's Sparrow	*Ammodramus leconteii*	2	0.0192										
Northern Pintail	*Anas acuta*	4	0.0384			1	0.0118						
American Wigeon	*Anas americana*	9	0.0863	3	0.0429	1	0.0118	8	0.0936			0	0
Northern Shoveler	*Anas clypeata*	2	0.0192	1	0.0143	6	0.071			8	0.0988	1	0.0122
Green-winged Teal	*Anas crecca*					2	0.0237	1	0.0117	1	0.0123		
American Green-winged Teal	*Anas crecca*	2	0.0192										
Mallard	*Anas platyrhynchos*	2773	26.5995	1323	18.9	2876	34.0355	1995	23.3333	2000	24.6914	1996	24.3415
American Black Duck	*Anas rubripes*	58	0.5564	21	0.3	55	0.6509	53	0.6199	75	0.9259	37	0.4512
Gadwall	*Anas strepera*	36	0.3453	19	0.2714	14	0.1657	9	0.1053	38	0.4691	22	0.2683
duck sp.	*Anatinae*			9	0.1286	168	1.9882						
Greater White-fronted Goose	*Anser albifrons*	2	0.0192										
Great Blue Heron (Blue form)	*Ardea herodias*	7	0.0671	1	0.0143	7	0.0828	5	0.0585	4	0.0494	5	0.061
Short-eared Owl	*Asio flammeus*									1	0.0123		
Long-eared Owl	*Asio otus*			1	0.0143	0	0			1	0.0123		
scaup sp.	*Aythya*	28	0.2686					210	2.4561				
Lesser Scaup	*Aythya affinis*	16	0.1535	3	0.0429	501	5.929	11	0.1287	77	0.9506	33	0.4024
Redhead	*Aythya americana*	14	0.1343	9	0.1286	66	0.7811	2	0.0234	34	0.4198	43	0.5244
Ring-necked Duck	*Aythya collaris*	3	0.0288			1	0.0118	2	0.0234			1	0.0122
Greater Scaup	*Aythya marila*	11	0.1055	9	0.1286	2398	28.3787	632	7.3918	3172	39.1605	396	4.8293
Canvasback	*Aythya valisineria*	4	0.0384			8	0.0947			3	0.037	1	0.0122
Tufted Titmouse	*Baeolophus bicolor*	3	0.0288	2	0.0286	2	0.0237			5	0.0617		

TABLE F-2
Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years
OMC Plant 2

Common Name	Scientific Name	1999-2000		2000-2001		2002-2003		2003-2004		2004-2005		2005-2006	
		Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.
Cedar Waxwing	*Bombycilla cedrorum*	278	2.6667	78	1.1143	241	2.8521	333	3.8947	547	6.7531	316	3.8537
Canada Goose	*Branta canadensis*	35385	339.4245	287	4.1	24725	292.6036	10456	122.2924	18057	222.9259	10289	125.4756
Cackling Goose	*Branta hutchinsii*											28	0.3415
Great Horned Owl	*Bubo virginianus*	13	0.1247	10	0.1429	23	0.2722	13	0.152	6	0.0741	10	0.122
Bufflehead	*Bucephala albeola*	132	1.2662	47	0.6714	71	0.8402	106	1.2398	157	1.9383	56	0.6829
Common Goldeneye	*Bucephala clangula*	409	3.9233	306	4.3714	730	8.6391	134	1.5673	250	3.0864	204	2.4878
Red-tailed Hawk	*Buteo jamaicensis*	53	0.5084	46	0.6571	60	0.7101	42	0.4912	52	0.642	24	0.2927
Rough-legged Hawk	*Buteo lagopus*	1	0.0096	1	0.0143	1	0.0118						
Lapland Longspur	*Calcarius lapponicus*											88	1.0732
Northern Cardinal	*Cardinalis cardinalis*	225	2.1583	409	5.8429	337	3.9882	425	4.9708	386	4.7654	371	4.5244
Pine Siskin	*Carduelis pinus*	38	0.3645	10	0.1429	10	0.1183			80	0.9877	11	0.1341
American Goldfinch	*Carduelis tristis*	278	2.6667	405	5.7857	283	3.3491	571	6.6784	704	8.6914	496	6.0488
House Finch	*Carpodacus mexicanus*	256	2.4556	325	4.6429	222	2.6272	252	2.9474	304	3.7531	307	3.7439
Purple Finch	*Carpodacus purpureus*	5	0.048					1	0.0117	2	0.0247	1	0.0122
Hermit Thrush	*Catharus guttatus*	2	0.0192	1	0.0143	3	0.0355	7	0.0819	3	0.037	2	0.0244
Brown Creeper	*Certhia americana*	6	0.0576	3	0.0429	3	0.0355	6	0.0702	5	0.0617	6	0.0732
Belted Kingfisher	*Ceryle alcyon*	7	0.0671	3	0.0429	4	0.0473	6	0.0702	13	0.1605	7	0.0854
Killdeer	*Charadrius vociferus*	0	0										
Snow Goose	*Chen caerulescens*	5	0.048							2	0.0247		
Snow Goose (blue form)	*Chen caerulescens*					1	0.0118						
Ross's Goose	*Chen rossii*											1	0.0122
Northern Harrier	*Circus cyaneus*	8	0.0767	3	0.0429	1	0.0118						
Long-tailed Duck	*Clangula hyemalis*					3	0.0355			11	0.1358	3	0.0366
Oldsquaw	*Clangula hyemalis*	24	0.2302										
Northern Flicker	*Colaptes auratus*			6	0.0857	4	0.0473					7	0.0854
Northern (Yellow-shafted) Flicker	*Colaptes auratus*	10	0.0959					10	0.117	21	0.2593		

TABLE F-2
Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years
OMC Plant 2

Common Name	Scientific Name	1999-2000		2000-2001		2002-2003		2003-2004		2004-2005		2005-2006	
		Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.
Rock Pigeon	*Columba livia*									331	4.0864	277	3.378
Rock Dove	*Columba livia*	542	5.199	662	9.4571	440	5.2071	315	3.6842				
American Crow	*Corvus brachyrhynchos*	888	8.518	769	10.9857	690	8.1657	220	2.5731	480	5.9259	242	2.9512
Blue Jay	*Cyanocitta cristata*	60	0.5755	62	0.8857	249	2.9467	89	1.0409	276	3.4074	59	0.7195
Trumpeter Swan	*Cygnus buccinator*					0	0						
Tundra Swan	*Cygnus columbianus*					1	0.0118						
Mute Swan	*Cygnus olor*	32	0.307			25	0.2959	40	0.4678	27	0.3333	25	0.3049
Yellow-rumped Warbler	*Dendroica coronata*					11	0.1302	14	0.1637	5	0.0617	9	0.1098
Yellow-rumped (Myrtle) Warbler	*Dendroica coronata*	17	0.1631	1	0.0143								
Pine Warbler	*Dendroica pinus*									1	0.0123		
Horned Lark	*Eremophila alpestris*									20	0.2469	15	0.1829
Rusty Blackbird	*Euphagus carolinus*					2	0.0237						
Brewer's Blackbird	*Euphagus cyanocephalus*					1	0.0118						
Merlin	*Falco columbarius*					1	0.0118			1	0.0123		
Peregrine Falcon	*Falco peregrinus*					1	0.0118	1	0.0117	1	0.0123	1	0.0122
American Kestrel	*Falco sparverius*	10	0.0959	8	0.1143	7	0.0828	7	0.0819	10	0.1235	8	0.0976
American Coot	*Fulica americana*	51	0.4892	13	0.1857	126	1.4911	10	0.117	5	0.0617	12	0.1463
Wilson's Snipe	*Gallinago delicata*							1	0.0117				
Common Snipe	*Gallinago gallinago*					1	0.0118						
Common Loon	*Gavia immer*					1	0.0118					1	0.0122
Bald Eagle	*Haliaeetus leucocephalus*	0	0	1	0.0143	0	0						
blackbird sp.	*Icterinae*	50	0.4796										
Dark-eyed (Slate-colored) Junco	*Junco hyemalis*	931	8.9305	810	11.5714			965	11.2865			544	6.6341
Dark-eyed Junco	*Junco hyemalis*					755	8.9349			967	11.9383		

TABLE F-2
Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years
OMC Plant 2

Common Name	Scientific Name	1999-2000		2000-2001		2002-2003		2003-2004		2004-2005		2005-2006	
		Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.
Dark-eyed (Oregon) Junco	*Junco hyemalis*					1	0.0118						
Northern Shrike	*Lanius excubitor*	3	0.0288	1	0.0143			1	0.0117	5	0.0617	3	0.0366
gull sp.	*Larus*	74	0.7098	25	0.3571	692	8.1893					28	0.3415
Herring Gull	*Larus argentatus*	769	7.3765	348	4.9714	1724	20.4024	511	5.9766	232	2.8642	1244	15.1707
Ring-billed Gull	*Larus delawarensis*	658	6.3118	241	3.4429	861	10.1893	960	11.2281	1270	15.679	717	8.7439
Lesser Black-backed Gull	*Larus fuscus*					3	0.0355	1	0.0117				
Iceland Gull	*Larus glaucoides*					1	0.0118						
Glaucous Gull	*Larus hyperboreus*					2	0.0237					2	0.0244
Great Black-backed Gull	*Larus marinus*			1	0.0143			1	0.0117				
Thayer's Gull	*Larus thayeri*	2	0.0192	3	0.0429	2	0.0237	2	0.0234	1	0.0123	3	0.0366
Hooded Merganser	*Lophodytes cucullatus*	27	0.259	9	0.1286	16	0.1893	22	0.2573	31	0.3827	22	0.2683
Red Crossbill	*Loxia curvirostra*			2	0.0286								
Red-bellied Woodpecker	*Melanerpes carolinus*	69	0.6619	53	0.7571	126	1.4911	51	0.5965	105	1.2963	64	0.7805
Red-headed Woodpecker	*Melanerpes erythrocephalus*					2	0.0237	1	0.0117	7	0.0864		
dark-winged scoter sp.	*Melanitta*							3	0.0351				
White-winged Scoter	*Melanitta fusca*							3	0.0351	1	0.0123	18	0.2195
Black Scoter	*Melanitta nigra*					1	0.0118			2	0.0247	5	0.061
Surf Scoter	*Melanitta perspicillata*									4	0.0494	1	0.0122
Wild Turkey	*Meleagris gallopavo*							1	0.0117				
Swamp Sparrow	*Melospiza georgiana*	23	0.2206			9	0.1065	3	0.0351	8	0.0988	6	0.0732
Song Sparrow	*Melospiza melodia*	55	0.5276	12	0.1714	8	0.0947	20	0.2339	29	0.358	13	0.1585
Common Merganser	*Mergus merganser*	214	2.0528	213	3.0429	254	3.0059	41	0.4795	81	1	145	1.7683
Red-breasted Merganser	*Mergus serrator*	75	0.7194	22	0.3143	104	1.2308	50	0.5848	24	0.2963	93	1.1341
Northern Mockingbird	*Mimus polyglottos*			0	0								
Brown-headed Cowbird	*Molothrus ater*	3	0.0288	3	0.0429	2	0.0237	2	0.0234				
Snowy Owl	*Nyctea scandiaca*	0	0			1	0.0118						
Black-crowned Night-Heron	*Nycticorax nycticorax*	1	0.0096										

TABLE F-2

Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years

OMC Plant 2

Common Name	Scientific Name	1999-2000		2000-2001		2002-2003		2003-2004		2004-2005		2005-2006	
		Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.
Eastern Screech-Owl	*Otus asio*	5	0.048	3	0.0429	17	0.2012	3	0.0351	13	0.1605	5	0.061
Ruddy Duck	*Oxyura jamaicensis*	16	0.1535	2	0.0286								
House Sparrow	*Passer domesticus*	776	7.4436	1027	14.6714	1491	17.645	1604	18.7602	1543	19.0494	845	10.3049
Fox Sparrow	*Passerella iliaca*	2	0.0192	3	0.0429					3	0.037		
Double-crested Cormorant	*Phalacrocorax auritus*	2	0.0192			2	0.0237	5	0.0585			9	0.1098
Ring-necked Pheasant	*Phasianus colchicus*	1	0.0096	3	0.0429	1	0.0118						
Downy Woodpecker	*Picoides pubescens*	131	1.2566	156	2.2286	222	2.6272	201	2.3509	195	2.4074	170	2.0732
Hairy Woodpecker	*Picoides villosus*	52	0.4988	29	0.4143	53	0.6272	32	0.3743	52	0.642	57	0.6951
Eastern Towhee	*Pipilo erythrophthalmus*							1	0.0117				
Snow Bunting	*Plectrophenax nivalis*	41	0.3933	25	0.3571	5	0.0592	3	0.0351	4	0.0494	27	0.3293
Horned Grebe	*Podiceps auritus*	1	0.0096										
Pied-billed Grebe	*Podilymbus podiceps*									1	0.0123		
Black-capped Chickadee	*Poecile atricapillus*	459	4.4029	778	11.1143	686	8.1183	511	5.9766	641	7.9136	536	6.5366
Common Grackle	*Quiscalus quiscula*	2	0.0192	4	0.0571	1	0.0118	1	0.0117	6	0.0741		
Virginia Rail	*Rallus limicola*	2	0.0192			2	0.0237						
Golden-crowned Kinglet	*Regulus satrapa*	6	0.0576					4	0.0468	5	0.0617	5	0.061
Eastern Bluebird	*Sialia sialis*					4	0.0473	12	0.1404	15	0.1852	9	0.1098
Red-breasted Nuthatch	*Sitta canadensis*	40	0.3837	13	0.1857	57	0.6746	3	0.0351	61	0.7531	24	0.2927
White-breasted Nuthatch	*Sitta carolinensis*	51	0.4892	123	1.7571	135	1.5976	114	1.3333	156	1.9259	136	1.6585
Brown-headed Nuthatch	*Sitta pusilla*					1	0.0118						
Yellow-bellied Sapsucker	*Sphyrapicus varius*	2	0.0192					1	0.0117	2	0.0247	1	0.0122
American Tree Sparrow	*Spizella arborea*	639	6.1295	259	3.7	558	6.6036	343	4.0117	758	9.358	256	3.122
Field Sparrow	*Spizella pusilla*			1	0.0143					1	0.0123		
Barred Owl	*Strix varia*					1	0.0118						
European Starling	*Sturnus vulgaris*	8353	80.1247	1198	17.1143	1890	22.3669	3112	36.3977	1256	15.5062	1402	17.0976
Carolina Wren	*Thryothorus ludovicianus*	2	0.0192	2	0.0286			1	0.0117	1	0.0123	2	0.0244
Brown Thrasher	*Toxostoma rufum*			1	0.0143								

TABLE F-2
Bird Species Observed in Waukegan Christmas Bird Counts from the Past 5 Years
OMC Plant 2

Common Name	Scientific Name	1999-2000		2000-2001		2002-2003		2003-2004		2004-2005		2005-2006	
		Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.	Number	Number / Party Hr.
Winter Wren	*Troglodytes troglodytes*	4	0.0384					1	0.0117	2	0.0247	2	0.0244
American Robin	*Turdus migratorius*	597	5.7266	296	4.2286	638	7.5503	4918	57.5205	263	3.2469	1091	13.3049
Mourning Dove	*Zenaida macroura*	708	6.7914	772	11.0286	561	6.6391	538	6.2924	840	10.3704	610	7.439
White-throated Sparrow	*Zonotrichia albicollis*	30	0.2878	25	0.3571	34	0.4024	42	0.4912	55	0.679	16	0.1951
White-crowned Sparrow	*Zonotrichia leucophrys*	4	0.0384			2	0.0237						

Blank cells indicate bird not observed in count year

TABLE F-3
Mammal Species Observed at Illinois State Beach Park
OMC Plant 2

Common Name	Scientific Name
Least shrew	*Cryptotis parva parva*
Short-tailed Shrew	*Cryptotis parva parva*
Virgnia oppossum	*Didelphis virginiana*
Big brown bat	*Eptesicus fuscus fuscus*
Red bat	*Lasiurus borealis*
Woodchuck	*Marmota monax*
Striped skunk	*Mephitis mephitis*
Prairie vole	*Microtus ochrogaster*
Meadow vole	*Microtus pennsylvanicus*
House mouse	*Mus musculus*
Longtail weasel	*Mustela frenata*
Mink	*Mustela vison*
Little brown myotis bat	*Myotis lucifugus lucifugus*
Virgnia white tail deer	*Odocoileus virginianus*
Muskrat	*Ondatra zibethicus*
White footed mouse	*Peromyscus leucopus*
Deer mouse	*Peromyscus maniculatus*
Raccoon	*Procyon lotor*
Norway rat	*Rattus norvegicus*
Eastern mole	*Scalopus aquaticus*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern fox squirrel	*Sciurus niger*
Franklin ground squirrel	*Spermophilus franklinii*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern chipmunk	*Tamias striatus*
Badger	*Taxidea taxus*
Red fox	*Vulpes vulpes*

TABLE F-4
Threatened and Endangered Species in the Vicinity of the Site
OMC Plant 2

Common Name	Scientific Name	Taxon	Status
Marram grass	*Ammophila breviligulata*	Plant	SE
Sea rocket	*Cakile edentula*	Plant	ST
Golden sedge	*Carex aurea*	Plant	ST
Little green sedge	*Carex viridula*	Plant	ST
Seaside spurge	*Chamaesyce polygonifolia*	Plant	SE
Bearded wheat grass	*Elymus trachycaulus*	Plant	ST
Kalm’s St. John's wort	*Hypericum kalmianum*	Plant	SE
Rush	*Juncus alpinoarticulatus*	Plant	SE
Ground juniper	*Juniperus communis*	Plant	ST
Small sundrops	*Oenothera perennis*	Plant	ST
Eastern prairie fringed orchid	*Platanthera leucophaea*	Plant	SE, FT
Slender bog arrow grass	*Triglochin palustris*	Plant	ST
Small bladderwort	*Utricularia minor*	Plant	SE
Redveined prairie leafhopper	*Aflexia rubranura*	Invertebrate	ST
Henslow’s sparrow	*Ammodramus henslowii*	Bird	ST
Upland sandpiper	*Bartramia longicauda*	Bird	SE
Peregrine falcon	*Falco peregrinus*	Bird	ST
Black-crowned night heron	*Nycticorax nycticorax*	Bird	SE
Common tern	*Sterna hirundo*	Bird	SE

SE - state endangered
ST - state threatened
FT - federally threatened

TABLE F-5
Summary Statistics for Surface Soil Outside of Building Footprint [1]
OMC Plant 2

Chemical	Frequency of Detection	Minimum Concentration Detected	Maximum Concentration Detected	Arithmetic Mean	Standard Deviation
Metals (mg/kg)					
Aluminum	14 / 14	6.20E+02	1.30E+03	9.12E+02	2.62E+02
Arsenic	14 / 14	7.70E-01	5.40E+00	2.17E+00	1.33E+00
Barium	14 / 14	2.70E+00	7.10E+00	4.48E+00	1.61E+00
Beryllium	14 / 14	2.10E-01	4.00E-01	2.68E-01	4.92E-02
Cadmium	7 / 14	1.10E-01	1.70E-01	1.23E-01	3.10E-02
Chromium, Total	14 / 14	2.40E+00	1.00E+01	5.13E+00	2.60E+00
Cobalt	14 / 14	9.50E-01	1.80E+00	1.24E+00	3.01E-01
Copper	14 / 14	1.40E+00	4.50E+00	2.31E+00	9.02E-01
Iron	14 / 14	2.50E+03	4.80E+03	3.35E+03	8.02E+02
Lead	14 / 14	1.80E+00	1.10E+01	3.92E+00	2.52E+00
Magnesium	14 / 14	6.10E+03	1.60E+04	1.07E+04	2.65E+03
Manganese	14 / 14	7.50E+01	2.70E+02	1.08E+02	4.85E+01
Mercury	7 / 14	5.60E-03	8.70E-03	7.87E-03	1.35E-03
Nickel	14 / 14	2.00E+00	4.10E+00	2.76E+00	6.99E-01
Vanadium	14 / 14	5.30E+00	1.30E+01	7.94E+00	2.09E+00
Zinc	14 / 14	1.00E+01	2.80E+01	1.82E+01	5.55E+00
Polychlorinated Biphenyls (μg/kg)					
PCB-1248	70 / 83	1.00E+01	7.30E+05	1.72E+04	9.53E+04
PCB-1254	25 / 83	8.20E+00	1.90E+05	4.89E+03	2.40E+04
PCB-1260	19 / 83	2.60E+01	2.10E+05	4.44E+03	2.58E+04
Semivolatile Organics (μg/kg)					
1,2-Benzphenanthracene	40 / 64	4.40E+00	6.30E+04	3.94E+03	1.05E+04
2-Methylnaphthalene	9 / 52	4.20E+00	3.00E+03	3.56E+02	6.06E+02
Acenaphthene	18 / 64	4.80E+00	1.90E+04	1.48E+03	2.91E+03
Acenaphthylene	7 / 52	5.20E+00	2.10E+03	3.41E+02	5.29E+02
Acetophenone	9 / 29	4.90E+01	1.70E+02	1.52E+02	5.24E+01
Anthracene	27 / 64	4.30E+00	1.70E+04	1.61E+03	2.82E+03
Benzo(a)anthracene	37 / 64	3.90E+00	4.70E+04	2.81E+03	6.63E+03
Benzo(a)pyrene	39 / 64	4.00E+00	4.00E+04	2.98E+03	6.45E+03
Benzo(b)fluoranthene	39 / 64	4.80E+00	5.10E+04	3.51E+03	8.12E+03
Benzo(g,h,i)perylene	35 / 64	4.70E+00	3.20E+04	2.30E+03	4.84E+03
Benzo(k)fluoranthene	32 / 64	1.30E+01	2.90E+04	2.49E+03	5.02E+03
Bis(2-ethylhexyl)phthalate	29 / 64	2.50E+01	3.10E+03	1.34E+03	2.02E+03
Carbazole	20 / 64	4.80E+01	1.70E+04	1.58E+03	2.77E+03
Dibenz(a,h)anthracene	27 / 64	7.20E+00	1.30E+04	1.77E+03	2.83E+03
Dibenzofuran	14 / 64	5.90E+00	1.60E+04	1.44E+03	2.66E+03
Di-n-butylphthalate	16 / 46	2.10E+01	3.90E+02	1.34E+02	7.58E+01
Fluoranthene	44 / 64	4.20E+00	1.50E+05	6.87E+03	2.06E+04
Fluorene	16 / 64	8.40E+00	1.70E+04	1.52E+03	2.74E+03
Indeno(1,2,3-cd)pyrene	37 / 64	3.40E+00	2.70E+04	2.51E+03	5.14E+03
Naphthalene	9 / 64	1.40E+01	5.10E+03	1.30E+03	2.02E+03
Phenanthrene	35 / 64	8.00E+00	2.00E+05	6.52E+03	2.57E+04
Pyrene	43 / 64	5.80E+00	1.40E+05	6.45E+03	1.90E+04

TABLE F-5

Summary Statistics for Surface Soil Outside of Building Footprint [1]

OMC Plant 2

Chemical	Frequency of Detection			Minimum Concentration Detected	Maximum Concentration Detected	Arithmetic Mean	Standard Deviation
Volatile Organics (µg/kg)							
Dichloromethane	11	/	50	2.00E+00	6.00E+00	5.81E+00	1.70E+00
Trichloroethylene	11	/	50	2.00E+00	1.60E+02	1.18E+01	2.30E+01
Carbon Disulfide	6	/	50	2.00E+00	6.00E+00	5.80E+00	1.77E+00
Acetone	4	/	50	9.00E+00	5.40E+01	8.55E+00	8.22E+00
Benzene	1	/	50	1.50E+01	1.50E+01	6.31E+00	1.87E+00
Soil Quality Parameters							
pH	14	/	14	7.70E+00	9.00E+00	8.46E+00	4.07E-01

[1] Surface soil defined as samples that start at less than a depth of 0.5 foot .

TABLE F-6
Assessment and Measurement Endpoints
OMC Plant 2

Assessment Endpoint	Measurement Endpoint	Receptor
Survival, growth, and reproduction of terrestrial soil invertebrate communities	Comparison of screening values for soil invertebrates with chemical concentrations in surface soil	Soil invertebrates (earthworms)
Survival, growth, and reproduction of terrestrial plant communities	Comparison of screening values for terrestrial plants with chemical concentrations in surface soil	Terrestrial plants
Survival, growth, and reproduction of threatened and endangered plant species	Comparison of screening values for terrestrial plants with chemical concentrations in surface soil	Threatened and endangered plant species
Survival, growth, and reproduction of avian terrestrial insectivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	American robin
Survival, growth, and reproduction of avian terrestrial carnivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Red-tailed hawk
Survival, growth, and reproduction of avian terrestrial herbivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Mourning dove
Survival, growth, and reproduction of mammalian terrestrial insectivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Short-tailed shrew
Survival, growth, and reproduction of mammalian terrestrial herbivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Meadow vole
Survival, growth, and reproduction of mammalian terrestrial carnivores	Comparison of chronic ingestion-based screening values for survival, growth, and/or reproductive effects with modeled dietary exposure doses based on surface soil concentrations	Red fox
Survival, growth, and reproduction of terrestrial reptiles	Evidence of potential risk to other upper trophic level terrestrial receptors evaluated in the ERA	--

TABLE F-7
Surface Soil Screening Values
OMC Plant 2

Chemical	Soil Flora Screening Value	Soil Flora Units	Soil Flora Reference	Soil Fauna Screening Value	Soil Fauna Units	Soil Fauna Reference
Metals						
Aluminum	pH<5.5	mg/kg	USEPA, 2003a	pH<5.5	mg/kg	USEPA, 2003a
Arsenic	1.80E+01	mg/kg	USEPA, 2005b	6.00E+01	mg/kg	Efroymson et al., 1997b
Barium	5.00E+02	mg/kg	Efroymson et al., 1997a	3.30E+02	mg/kg	USEPA, 2005c
Beryllium	1.00E+01	mg/kg	Efroymson et al., 1997a	4.00E+01	mg/kg	USEPA, 2005d
Cadmium	3.20E+01	mg/kg	USEPA, 2005e	2.00E+01	mg/kg	Efroymson et al., 1997b
Chromium, Total	1.00E+00	mg/kg	Efroymson et al., 1997a	4.00E-01	mg/kg	Efroymson et al., 1997b
Cobalt	1.30E+01	mg/kg	USEPA, 2005f	2.00E+01 a	mg/kg	MHSPE, 1994
Copper	1.00E+02	mg/kg	Efroymson et al., 1997a	5.00E+01	mg/kg	Efroymson et al., 1997b
Iron	5<pH<8		USEPA, 2003b	5<pH<8	mg/kg	USEPA, 2003b
Lead	1.20E+02	mg/kg	USEPA, 2005g	1.70E+03	mg/kg	USEPA, 2005g
Manganese	5.00E+02	mg/kg	Efroymson et al., 1997a	1.00E+02		USEPA, 2001
Mercury	3.00E-01	mg/kg	Efroymson et al., 1997a	1.00E-01	mg/kg	Efroymson et al., 1997b
Nickel	3.00E+01	mg/kg	Efroymson et al., 1997a	2.00E+02	mg/kg	Efroymson et al., 1997b
Vanadium	2.00E+00	mg/kg	Efroymson et al., 1997a	2.00E+00		USEPA, 2001
Zinc	5.00E+01	mg/kg	Efroymson et al., 1997a	2.00E+02	mg/kg	Efroymson et al., 1997b
Polychlorinated Biphenyls						
PCB-1248	4.00E+04	µg/kg	Efroymson et al., 1997a	2.51E+03	µg/kg	USEPA, 1999
PCB-1254	4.00E+04 b	µg/kg	Efroymson et al., 1997a	2.51E+03 b	µg/kg	USEPA, 1999
PCB-1260	4.00E+04 b	µg/kg	Efroymson et al., 1997a	2.51E+03 b	µg/kg	USEPA, 1999
Semivolatile Organics						
1,2-Benzphenanthrene	1.20E+03 c	µg/kg	--	2.50E+04 c	µg/kg	--
2-Methylnaphthalene	3.00E+01 d	µg/kg	CCME, 1999	5.40E+02 d	µg/kg	CCME, 1999
Acenaphthene	2.00E+04	µg/kg	Efroymson et al., 1997a	1.40E+04 e	µg/kg	--
Acenaphthylene	2.00E+04 f			1.40E+04 e	µg/kg	--
Acetophenone	3.00E+04 d	µg/kg	USEPA, 2003c	3.00E+04 d	µg/kg	USEPA, 2003c
Anthracene	1.20E+03 c	µg/kg	--	2.50E+04 c	µg/kg	--
Benzaldehyde	No Screening Value			No Screening Value		
Benzo(a)anthracene	1.20E+03	µg/kg	USEPA, 1999	2.50E+04	µg/kg	USEPA, 1999
Benzo(a)pyrene	1.20E+03	µg/kg	USEPA, 1999	2.50E+04	µg/kg	USEPA, 1999
Benzo(b)fluoranthene	1.20E+03 c	µg/kg	--	2.50E+04 c	µg/kg	--

TABLE F-7
Surface Soil Screening Values
OMC Plant 2

Chemical	Soil Flora				Soil Fauna			
	Screening Value		Units	Reference	Screening Value		Units	Reference
Benzo(g,h,i)perylene	1.20E+03	c	µg/kg	--	2.50E+04	c	µg/kg	--
Benzo(k)fluoranthene	1.20E+03	c	µg/kg	--	2.50E+04	c	µg/kg	--
Bis(2-ethylhexyl)phthalate	1.00E+02	ag	µg/kg	MHSPE, 1994	1.00E+02	ag	µg/kg	MHSPE, 1994
Carbazole	No Screening Value				1.70E+04	h	µg/kg	Sverdrup et al., 2001
Dibenz(a,h)anthracene	1.20E+03		µg/kg	USEPA, 1999	2.50E+04		µg/kg	USEPA, 1999
Dibenzofuran	No Screening Value				1.40E+04	h		Sverdrup et al., 2001
Di-n-butylphthalate	2.00E+05		µg/kg	Efroymson et al., 1997a	3.05E+04	ag	µg/kg	MHSPE, 1994
Fluoranthene	1.20E+03	c	µg/kg	--	2.10E+04	h	µg/kg	Sverdrup et al., 2001
Fluorene	1.20E+03	c	µg/kg	--	1.40E+04	h	µg/kg	Sverdrup et al., 2001
Indeno(1,2,3-cd)pyrene	1.20E+03	c	µg/kg	--	2.50E+04	c	µg/kg	--
Naphthalene	3.00E+01	j	µg/kg	CCME, 1999	5.40E+02	i	µg/kg	CCME, 1999
Phenanthrene	1.20E+03	c	µg/kg	--	2.10E+04	h	µg/kg	Sverdrup et al., 2001
Pyrene	1.20E+03	c	µg/kg	--	1.30E+04	h	µg/kg	Sverdrup et al., 2001
Volatile Organics								
Acetone	2.50E+03			USEPA, 2003c	2.50E+03			USEPA, 2003c
Benzene	2.40E+02	i	µg/kg	CCME, 1999	1.61E+03	i	µg/kg	CCME, 1999
Carbon Disulfide	9.41E+01			USEPA, 2003c	9.41E+01			USEPA, 2003c
Cyclohexane	3.05E+03	j	ug/kg	Beyer et al., 1990	3.05E+03	j	µg/kg	Beyer et al., 1990
cis-1,2-Dichloroethylene	7.84E+02	k		USEPA, 2003c	7.84E+02	k		USEPA, 2003c
Dichloromethane	2.00E+03			USEPA, 2001	2.00E+03			USEPA, 2001
Methylbenzene	7.00E+01	i	ug/kg	CCME, 1999	4.40E+02	i	µg/kg	CCME, 1999
Trichloroethylene	1.40E+02	i	ug/kg	CCME, 1999	7.90E+02	i	µg/kg	CCME, 1999

a - Target Value
b - PCB-1248 value used
c - Benzo(a)pyrene value used
d - Naphthalene value used
e - Fluorene value used
f - Acenaphthene value used
g - Total phthalates value used
h - NOEC
i - Uncertainty factor of 100 applied to LC25
j - Mean of background and additional study
k - trans-1,2-dichloroethylene value used

TABLE F-8
Ingestion Screening Values for Birds
OMC Plant 2

Chemical	Test Organism	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Reference	Robin	Dove	Hawk
Inorganics										
Arsenic	cowbird	7 months	oral in diet	survival	2.46E+00	7.38E+00	Sample et al., 1996	X	X	X
Cadmium	mallard	90 days	oral in diet	reproduction	1.45E+00	2.00E+01	Sample et al., 1996	X	X	X
Chromium	black duck	10 months	oral in diet	reproduction	1.00E+00	5.00E+00	Sample et al., 1996	X	X	X
Copper	chicks	10 weeks	oral in diet	growth/survival	4.70E+01	6.17E+01	Sample et al., 1996	X	X	X
Lead	quail	12 weeks	oral in diet	reproduction	1.13E+00	1.13E+01	Sample et al., 1996		X	
Lead	American kestrel	7 months	oral in diet	reproduction	3.85E+00	3.85E+01 a	Sample et al., 1996	X		X
Mercury	red-tailed hawk	12 weeks	oral in diet	survival/neurological	4.90E-01	1.20E+00	USEPA, 1995b	X		X
Mercury	Japanese quail	1 year	oral in diet	reproduction	4.50E-01	9.00E-01	Sample et al., 1996		X	
Nickel	mallard	90 days	oral in diet	growth/survival	7.74E+01	1.07E+02	Sample et al., 1996	X	X	X
Zinc	chicken	44 weeks	oral in diet	reproduction	1.45E+01	1.31E+02	Sample et al., 1996	X	X	X
Polychlorinated Biphenyls										
PCB-1248	ring-necked pheasant	17 weeks	oral	reproduction	1.80E-01 ab	1.80E+00 b	Sample et al., 1996		X	
PCB-1248	screech owl	2 generations	oral in diet	reproduction	4.10E-01 c	4.10E+00 ac	Sample et al., 1996	X		X
PCB-1254	ring-necked pheasant	17 weeks	oral	reproduction	1.80E-01 a	1.80E+00	Sample et al., 1996		X	
PCB-1254	screech owl	2 generations	oral in diet	reproduction	4.10E-01 c	4.10E+00 ac	Sample et al., 1996	X		X
PCB-1260	ring-necked pheasant	17 weeks	oral	reproduction	1.80E-01 ab	1.80E+00 b	Sample et al., 1996		X	
PCB-1260	screech owl	2 generations	oral in diet	reproduction	4.10E-01 c	4.10E+00 ac	Sample et al., 1996	X		X
Semivolatile Organics										
Acenaphthene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Acenaphthylene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Anthracene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Benzo(a)anthracene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Benzo(a)pyrene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 a	Rigdon and Neal, 1963	X	X	X
Benzo(b)fluoranthene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Benzo(g,h,i)perylene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Benzo(k)fluoranthene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Dibenz(a,h)anthracene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Fluoranthene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Fluorene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Phenanthrene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X
Pyrene	chicken	34 days	oral in diet	reproduction	7.10E+00 de	7.10E+01 ae	Rigdon and Neal, 1963	X	X	X

a - Uncertainty factor of 10 applied for conversion between NOAEL and LOAEL
b - PCB-1254 values used
c - PCB-1242 value used
d - Subchronic to chronic uncertainty factor of 10 applied
e - Benzo(a)pyrene value used

TABLE F-9

Ingestion Screening Values for Mammals

OMC Plant 2

Chemical	Test Organism	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)	LOAEL (mg/kg/d)	Reference	Shrew	Vole	Fox
Inorganics										
Arsenic	mouse	3 generations	oral in water	reproduction	1.26E-01 a	1.26E+00	Sample et al., 1996	X	X	
Arsenic	dog	2 years	oral	--	1.25E+00 a	1.25E+01	USEPA, 1999			X
Cadmium	rat	6 weeks	oral (gavage)	reproduction	1.00E+00	1.00E+01	Sample et al., 1996	X	X	
Cadmium	dog	3 months	oral	reproduction	7.50E-01 a	7.50E+00	ATSDR, 1999			X
Chromium	rat	3 months	oral in water	survival	1.31E+01 a	1.31E+02	Sample et al., 1996	X	X	X
Copper	mouse	1 month + GD 0-19	oral in water	developmental	1.04E+02	7.80E+01	ATSDR, 1990	X	X	
Copper	mink	357 days	oral in diet	reproduction	1.17E+01	1.51E+01	Sample et al., 1996			X
Lead	rat	3 generations	oral in diet	reproduction	8.00E+00	8.00E+01	Sample et al., 1996	X	X	X
Mercury	rat	3 generations	oral in diet	reproduction	3.20E-02	1.60E-01	Sample et al., 1996	X	X	
Mercury	mink	93 days	oral in diet	survival	1.50E-01	2.50E-01	Sample et al., 1996			X
Nickel	rat	3 generations	oral in diet	reproduction	4.00E+01	8.00E+01	Sample et al., 1996	X	X	X
Zinc	rat	GD 1-16	oral in diet	reproduction	1.60E+02	3.20E+02	Sample et al., 1996	X	X	
Zinc	mink	25 weeks	oral	reproduction	2.08E+01 a	2.08E+02	ATSDR, 1994			X
Polychlorinated Biphenyls										
PCB-1248	oldfield mouse	12 months	oral in diet	reproduction	6.80E-02 ab	6.80E-01 b	Sample et al., 1996	X	X	
PCB-1248	mink	4.5 months	oral in diet	reproduction	1.40E-01 b	6.90E-01 b	Sample et al., 1996			X
PCB-1254	oldfield mouse	12 months	oral in diet	reproduction	6.80E-02 a	6.80E-01	Sample et al., 1996	X	X	
PCB-1254	mink	4.5 months	oral in diet	reproduction	1.40E-01	6.90E-01	Sample et al., 1996			X
PCB-1260	oldfield mouse	12 months	oral in diet	reproduction	6.80E-02 ab	6.80E-01 b	Sample et al., 1996	X	X	
PCB-1260	mink	4.5 months	oral in diet	reproduction	1.40E-01 b	6.90E-01 b	Sample et al., 1996			X
Semivolatile Organics										
Acenaphthene	mouse	13 weeks	oral (gavage)	reproduction	3.50E+02 d	7.50E+02 d	ATSDR, 1995	X	X	X
Acenaphthylene	mouse	13 weeks	oral (gavage)	reproduction	3.50E+02	7.50E+02	ATSDR, 1995	X	X	X
Anthracene	mouse	13 weeks	oral (gavage)	reproduction	1.00E+03	1.00E+04 a	ATSDR, 1995	X	X	X
Benzo(a)anthracene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00 ae	1.00E+01 ae	Sample et al., 1996	X	X	X
Benzo(a)pyrene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00 a	1.00E+01	Sample et al., 1996	X	X	X
Benzo(b)fluoranthene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00 ae	1.00E+01 e	Sample et al., 1996	X	X	X
Benzo(g,h,i)perylene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00 ae	1.00E+01 e	Sample et al., 1996	X	X	X
Benzo(k)fluoranthene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00 ae	1.00E+01 e	Sample et al., 1996	X	X	X

TABLE F-9
Ingestion Screening Values for Mammals
OMC Plant 2

Chemical	Test Organism	Duration	Exposure Route	Effect/Endpoint	NOAEL (mg/kg/d)		LOAEL (mg/kg/d)		Reference	Shrew	Vole	Fox
Dibenz(a,h)anthracene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00	ae	1.00E+01	e	Sample et al., 1996	X	X	X
Fluoranthene	mouse	13 weeks	oral (gavage)	reproduction	5.00E+03		5.00E+03	a	ATSDR, 1995	X	X	X
Fluorene	mouse	13 weeks	oral (gavage)	reproduction	5.00E+02		5.00E+02	a	ATSDR, 1995	X	X	X
Indeno(1,2,3-cd)pyrene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00	ae	1.00E+01	e	Sample et al., 1996	X	X	X
Phenanthrene	mouse	13 weeks	oral (gavage)	reproduction	5.00E+03	f	5.00E+03	af	ATSDR, 1995	X	X	X
Pyrene	mouse	GD 7-16	oral (gavage)	reproduction	1.00E+00	ae	1.00E+01	e	Sample et al., 1996	X	X	X

a - Uncertainty factor of 10 applied for conversion between NOAEL and LOAEL
b - PCB-1254 value used
c - 1,2-Dichlorobenzene value used
d - Acenaphthene value used
e - Benzo(a)pyrene value used
f - Fluoranthene value used

TABLE F-10
Soil Bioconcentration Factors
OMC Plant 2

Chemical	Kow		Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)		Soil-Vole BAF (dry weight)		Soil-Shrew BAF (dry weight)	
	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference
Inorganics										
Arsenic	--	--	1.10E+00	90th Percentile; Bechtel Jacobs, 1998	5.23E-01	90th Percentile; Sample et al., 1998a	1.60E-02	90th Percentile; Sample et al., 1998b	1.49E-02	90th Percentile; Sample et al., 1998b
Cadmium	--	--	3.25E+00	90th Percentile; Bechtel Jacobs, 1998	4.07E+01	90th Percentile; Sample et al., 1998a	4.48E-01	90th Percentile; Sample et al., 1998b	7.02E+00	90th Percentile; Sample et al., 1998b
Chromium	--	--	8.39E-02	90th Percentile; Bechtel Jacobs, 1998	3.16E+00	90th Percentile; Sample et al., 1998a	3.09E-01	90th Percentile; Sample et al., 1998b	3.33E-01	90th Percentile; Sample et al., 1998b
Copper	--	--	6.25E-01	90th Percentile; Bechtel Jacobs, 1998	1.53E+00	90th Percentile; Sample et al., 1998a	1.29E+00	90th Percentile; Sample et al., 1998b	1.12E+00	90th Percentile; Sample et al., 1998b
Lead	--	--	4.68E-01	90th Percentile; Bechtel Jacobs, 1998	1.52E+00	90th Percentile; Sample et al., 1998a	1.87E-01	90th Percentile; Sample et al., 1998b	3.39E-01	90th Percentile; Sample et al., 1998b
Mercury	--	--	5.00E+00	90th Percentile; Bechtel Jacobs, 1998	2.06E+01	90th Percentile; Sample et al., 1998a	1.92E-01	90th Percentile; Sample et al., 1998b	1.92E-01	90th Percentile; Sample et al., 1998b
Nickel	--	--	1.41E+00	90th Percentile; Bechtel Jacobs, 1998	4.73E+00	90th Percentile; Sample et al., 1998a	8.98E-01	90th Percentile; Sample et al., 1998b	5.78E-01	90th Percentile; Sample et al., 1998b
Zinc	--	--	1.82E+00	90th Percentile; Bechtel Jacobs, 1998	1.29E+01	90th Percentile; Sample et al., 1998a	2.32E+00	90th Percentile; Sample et al., 1998b	2.90E+00	90th Percentile; Sample et al., 1998b
Polychlorinated Biphenyls										
PCB-1248	6.20E+00	Jones et al., 1997	Regression Equation Based on Kow	USEPA, 2005h	1.59E+01	90th Percentile; Sample et al., 1998a	--	see text	--	see text
PCB-1254	6.50E+00	Jones et al., 1997	Regression Equation Based on Kow	USEPA, 2005h	1.59E+01	90th Percentile; Sample et al., 1998a	--	see text	--	see text
PCB-1260	6.80E+00	Jones et al., 1997	Regression Equation Based on Kow	USEPA, 2005h	1.59E+01	90th Percentile; Sample et al., 1998a	--	see text	--	see text

TABLE F-10
Soil Bioconcentration Factors
OMC Plant 2

	Kow		Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)		Soil-Vole BAF (dry weight)		Soil-Shrew BAF (dry weight)	
Chemical	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference
Semivolatile Organics										
Acenaphthene	--	--	Regression Equation	USEPA, 2005h	3.00E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Acenaphthylene	--	--	Regression Equation	USEPA, 2005h	2.20E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Anthracene	--	--	Regression Equation	USEPA, 2005h	3.20E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(a)anthracene	--	--	Regression Equation	USEPA, 2005h	2.70E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(a)pyrene	--	--	Regression Equation	USEPA, 2005h	3.40E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(b)fluoranthene	--	--	3.10E-01	Median; USEPA, 2005h	2.10E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(g,h,i)perylene	--	--	6.09E-03	Median; USEPA, 2005h	1.50E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(k)fluoranthene	--	--	Regression Equation	USEPA, 2005h	2.10E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Dibenz(a,h)anthracene	--	--	1.30E-01	Median; USEPA, 2005h	4.90E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Fluoranthene	--	--	5.00E-01	Median; USEPA, 2005h	3.70E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Fluorene	--	--	Regression Equation	USEPA, 2005h	2.00E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Indeno(1,2,3-cd)pyrene	--	--	1.10E-01	Median; USEPA, 2005h	4.10E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Phenanthrene	--	--	Regression Equation	USEPA, 2005h	2.80E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text
Pyrene	--	--	7.20E-01	Median; USEPA, 2005h	3.90E-01	Median; Beyer and Stafford, 1993	--	see text	--	see text

TABLE F-11
Dietary Concentrations
OMC Plant 2

Chemical	Terr. Plant (mg/kg dry weight)		Soil Invert. (mg/kg dry weight)		Vole (mg/kg dry weight)		Shrew (mg/kg dry weight)	
	Current	Future	Current	Future	Current	Future	Current	Future
Inorganics								
Arsenic	5.96E+00	5.96E+00	2.82E+00	2.82E+00	8.64E-02	8.64E-02	8.05E-02	8.05E-02
Cadmium	5.53E-01	5.53E-01	6.92E+00	6.92E+00	7.62E-02	7.62E-02	1.19E+00	1.19E+00
Chromium	8.39E-01	8.39E-01	3.16E+01	3.16E+01	3.09E+00	3.09E+00	3.33E+00	3.33E+00
Copper	2.81E+00	2.81E+00	6.89E+00	6.89E+00	5.81E+00	5.81E+00	5.03E+00	5.03E+00
Lead	5.15E+00	5.15E+00	1.67E+01	1.67E+01	2.06E+00	2.06E+00	3.73E+00	3.73E+00
Mercury	4.75E-02	4.75E-02	1.96E-01	1.96E-01	1.82E-03	1.82E-03	1.82E-03	1.82E-03
Nickel	5.79E+00	5.79E+00	1.94E+01	1.94E+01	3.68E+00	3.68E+00	2.37E+00	2.37E+00
Zinc	5.10E+01	5.10E+01	3.61E+02	3.61E+02	6.49E+01	6.49E+01	8.12E+01	8.12E+01
Polychlorinated Biphenyls								
PCB-1248	2.42E-02	2.42E-02	1.16E+04	1.16E+04	5.66E+00	5.66E+00	4.53E+03	4.53E+03
PCB-1254	3.82E-03	3.82E-03	3.02E+03	3.02E+03	1.47E+00	1.47E+00	1.18E+03	1.18E+03
PCB-1260	2.56E-03	2.56E-03	3.34E+03	3.34E+03	1.63E+00	1.63E+00	1.30E+03	1.30E+03
Semivolatile Organics								
Acenaphthene	1.13E-03	1.13E-03	1.26E+00	1.26E+00	3.29E-02	3.29E-02	7.30E-01	7.30E-01
Acenaphthylene	5.73E-01	5.73E-01	4.62E-01	4.62E-01	1.97E-01	1.97E-01	3.00E-01	3.00E-01
Anthracene	1.54E+00	1.54E+00	1.98E+00	1.98E+00	5.33E-01	5.33E-01	1.12E+00	1.12E+00
Benzo(a)anthracene	3.59E-01	3.59E-01	4.59E+00	4.59E+00	2.45E-01	2.45E-01	2.76E+00	2.76E+00
Benzo(a)pyrene	2.36E+00	2.36E+00	6.80E+00	6.80E+00	8.98E-01	8.98E-01	3.78E+00	3.78E+00
Benzo(b)fluoranthene	7.44E+00	7.44E+00	5.04E+00	5.04E+00	2.53E+00	2.53E+00	3.33E+00	3.33E+00
Benzo(g,h,i)perylene	7.45E+00	7.45E+00	1.80E+00	1.80E+00	2.44E+00	2.44E+00	1.39E+00	1.39E+00
Benzo(k)fluoranthene	1.58E+00	1.58E+00	4.41E+00	4.41E+00	6.60E-01	6.60E-01	2.92E+00	2.92E+00
Dibenz(a,h)anthracene	8.45E-01	8.45E-01	3.19E+00	3.19E+00	3.16E-01	3.16E-01	1.61E+00	1.61E+00
Fluoranthene	2.25E+01	2.25E+01	1.67E+01	1.67E+01	7.43E+00	7.43E+00	9.03E+00	9.03E+00
Fluorene	1.35E-03	1.35E-03	6.80E-01	6.80E-01	2.67E-02	2.67E-02	4.59E-01	4.59E-01
Indeno(1,2,3-cd)pyrene	1.65E+00	1.65E+00	6.15E+00	6.15E+00	6.35E-01	6.35E-01	3.24E+00	3.24E+00
Phenanthrene	9.22E+00	9.22E+00	1.32E+01	1.32E+01	3.27E+00	3.27E+00	7.80E+00	7.80E+00
Pyrene	3.24E+01	3.24E+01	1.76E+01	1.76E+01	1.05E+01	1.05E+01	9.38E+00	9.38E+00

TABLE F-12
Exposure Parameters for Upper Trophic Level Ecological Receptors
OMC Plant 2

Receptor	Maximum Body Weight (kg)		Minimum Body Weight (kg)		Food Ingestion Rate (kg/day - dry)		Dietary Composition (percent)				Soil Ingestion (percent)	
	Value	Reference	Value	Reference	Value	Reference	Terr. Plants	Soil Invert.	Vole	Shrew	Value	Reference
Mammals												
Short-tailed shrew	0.02131	avg max for M/F - PA; USEPA, 1993	0.013	avg min for M/F - PA; USEPA, 1993	0.0019	55.5% of max BW; USEPA, 1993	0	87.0	0	0	13.0	Sample and Suter, 1994
Meadow vole	0.0635	max for M/F - VA; Silva and Downing, 1995	0.030	min for M/F - VA; Silva and Downing, 1995	0.0031	32.5% of max BW; USEPA, 1993	97.6	0	0	0	2.4	Beyer et al., 1994
Red fox	4.87	max for M/F - MD; Silva and Downing, 1995	3.17	min for M/F - MD; Silva and Downing, 1995	0.1558	10% of max BW; Sample and Suter, 1994	0.0	0	48.6	48.6	2.8	Beyer et al., 1994
Birds												
American robin	0.103	max for M/F - PA; USEPA, 1993	0.064	min for M/F - PA; USEPA, 1993	0.0051	Weighted by diet; max BW; Levey and Karasov, 1989	0	95.6	0	0	4.6	Sample and Suter, 1994
Mourning dove	0.163	max for M/F; Tomlinson et al., 1994	0.105	min for M/F; Tomlinson et al., 1994	0.0179	allometric equation for birds based on max BW; USEPA, 1993	95.0	0	0	0	5.0	Assumed based on diet
Red-tailed hawk	1.235	highest mean; USEPA, 1993	0.957	minimum; USEPA, 1993	0.0395	10% of max BW; Sample and Suter, 1994	0	0	50.0	50.0	0	Sample and Suter, 1994

BW = Body Weight
M = Male
F = Female

TABLE F-13
Example Food Web Calculation
OMC Plant 2

$$DI_x = \frac{[\sum(FIR)(FC_{xi})(PDF_i) + [(FIR)(SC_x)(PDS)]}{BW}$$

$$HQ = \frac{DI_x}{\text{Screening Value}}$$

Symbol	Value	Description	Units
DI_x	Calculated	Dietary intake for constituent x (arsenic)	mg chemical/kg body weight/day
FIR	1.89E-03	Food ingestion rate (from Table F-12)	kg/day (dry weight)
FC_{xi}	2.82E+00	Concentration of constituent x in food item i (soil invertebrates; from Table F-11)	mg/kg (dry weight)
PDF_i	8.70E-01	Proportion of diet composed of food item i (soil invertebrates; from Table F-12)	(dry weight)
SC_x	5.40E+00	Concentration of constituent x (arsenic) in soil (maximum from Table F-5)	mg/kg (dry weight)
PDS	1.30E-01	Proportion of diet composed of soil (from Table F-12)	(dry weight)
BW	1.33E-02	Body weight (minimum from Table F-11)	kg (wet weight)

DI_x = 4.49E-01

Screening Value (from Table F-10) = 1.26E-01

HQ (see Table F-17) = 3.56E+00

TABLE F-14
Surface Soil Screening Statistics—Step 2—Current
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Metals (mg/kg)							
Aluminum	1.30E+03, pH 7.7-9	pH<5.5	OK	No	pH<5.5	OK	No
Arsenic	5.40E+00	1.80E+01	3.00E-01	No	6.00E+01	9.00E-02	No
Barium	7.10E+00	5.00E+02	1.42E-02	No	3.30E+02	2.15E-02	No
Beryllium	4.00E-01	1.00E+01	4.00E-02	No	4.00E+01	1.00E-02	No
Cadmium	1.70E-01	3.20E+01	5.31E-03	No	2.00E+01	8.50E-03	No
Chromium, Total	1.00E+01	1.00E+00	1.00E+01	Yes	4.00E-01	2.50E+01	Yes
Cobalt	1.80E+00	1.30E+01	1.38E-01	No	2.00E+01	9.00E-02	No
Copper	4.50E+00	1.00E+02	4.50E-02	No	5.00E+01	9.00E-02	No
Iron	4.80E+03, pH 7.7-9	5<pH<8	pH>8	Yes	5<pH<8	pH>8	Yes
Lead	1.10E+01	1.20E+02	9.17E-02	No	1.70E+03	6.47E-03	No
Manganese	2.70E+02	5.00E+02	5.40E-01	No	1.00E+02	2.70E+00	Yes
Mercury	8.70E-03	3.00E-01	2.90E-02	No	1.00E-01	8.70E-02	No
Nickel	4.10E+00	3.00E+01	1.37E-01	No	2.00E+02	2.05E-02	No
Vanadium	1.30E+01	2.00E+00	6.50E+00	Yes	2.00E+00	6.50E+00	No
Zinc	2.80E+01	5.00E+01	5.60E-01	No	2.00E+02	1.40E-01	No
Polychlorinated Biphenyls							
PCB-1248	7.30E+05	4.00E+04	1.83E+01	Yes	2.51E+03	2.91E+02	Yes
PCB-1254	1.90E+05	4.00E+04	4.75E+00	Yes	2.51E+03	7.57E+01	Yes
PCB-1260	2.10E+05	4.00E+04	5.25E+00	Yes	2.51E+03	8.37E+01	Yes
Semivolatile Organics							
1,2-Benzphenanthrene	6.30E+04	1.20E+03	5.25E+01	Yes	2.50E+04	2.52E+00	Yes
2-Methylnaphthalene	3.00E+03	3.00E+01	1.00E+02	Yes	5.40E+02	5.56E+00	Yes
Acenaphthene	1.90E+04	2.00E+04	9.50E-01	No	1.40E+04	1.36E+00	Yes
Acenaphthylene	2.10E+03	2.00E+04	1.05E-01	No	1.40E+04	1.50E-01	No
Acetophenone	1.70E+02	3.00E+04	5.67E-03	No	3.00E+04	5.67E-03	No
Anthracene	1.70E+04	1.20E+03	1.42E+01	Yes	2.50E+04	6.80E-01	No
Benzo(a)anthracene	4.70E+04	1.20E+03	3.92E+01	Yes	2.50E+04	1.88E+00	Yes
Benzo(a)pyrene	4.00E+04	1.20E+03	3.33E+01	Yes	2.50E+04	1.60E+00	Yes
Benzo(b)fluoranthene	5.10E+04	1.20E+03	4.25E+01	Yes	2.50E+04	2.04E+00	Yes
Benzo(g,h,i)perylene	3.20E+04	1.20E+03	2.67E+01	Yes	2.50E+04	1.28E+00	Yes
Benzo(k)fluoranthene	2.90E+04	1.20E+03	2.42E+01	Yes	2.50E+04	1.16E+00	Yes
Bis(2-ethylhexyl)phthalate	3.10E+03	1.00E+02	3.10E+01	Yes	1.00E+02	3.10E+01	Yes
Carbazole	1.70E+04	No Screening Value		Yes	1.70E+04	1.00E+00	Yes
Dibenz(a,h)anthracene	1.30E+04	1.20E+03	1.08E+01	Yes	2.50E+04	5.20E-01	No
Dibenzofuran	1.60E+04	No Screening Value		Yes	1.40E+04	1.14E+00	Yes
Di-n-butylphthalate	3.90E+02	2.00E+05	1.95E-03	No	3.05E+04	1.28E-02	No
Fluoranthene	1.50E+05	1.20E+03	1.25E+02	Yes	2.10E+04	7.14E+00	Yes
Fluorene	1.70E+04	1.20E+03	1.42E+01	Yes	1.40E+04	1.21E+00	Yes
Indeno(1,2,3-cd)pyrene	2.70E+04	1.20E+03	2.25E+01	Yes	2.50E+04	1.08E+00	Yes
Naphthalene	5.10E+03	3.00E+01	1.70E+02	Yes	5.40E+02	9.44E+00	Yes
Phenanthrene	2.00E+05	1.20E+03	1.67E+02	Yes	2.10E+04	9.52E+00	Yes
Pyrene	1.40E+05	1.20E+03	1.17E+02	Yes	1.30E+04	1.08E+01	Yes

TABLE F-14
Surface Soil Screening Statistics—Step 2—Current
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora		Retained as a Step 2 COPEC?	Soil Fauna		Retained as a Step 2 COPEC?
		Screening Value	HQ		Screening Value	HQ	
Volatile Organics							
Acetone	5.40E+01	2.50E+03	2.16E-02	No	2.50E+03	2.16E-02	No
Benzene	1.50E+01	2.40E+02	6.25E-02	No	1.61E+03	9.32E-03	No
Carbon Disulfide	6.00E+00	9.41E+01	6.38E-02	No	9.41E+01	6.38E-02	No
Dichloromethane	6.00E+00	2.00E+03	3.00E-03	No	2.00E+03	3.00E-03	No
Trichloroethylene	1.60E+02	1.40E+02	1.14E+00	Yes	7.90E+02	2.03E-01	No

TABLE F-15
Surface Soil Screening Statistics—Step 2—Future Redevelopment
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Metals (mg/kg)							
Aluminum	1.30E+03, pH 7.7-9	pH<5.5	OK	No	pH<5.5	OK	No
Arsenic	5.40E+00	1.80E+01	3.00E-01	No	6.00E+01	9.00E-02	No
Barium	7.10E+00	5.00E+02	1.42E-02	No	3.30E+02	2.15E-02	No
Beryllium	4.00E-01	1.00E+01	4.00E-02	No	4.00E+01	1.00E-02	No
Cadmium	1.70E-01	3.20E+01	5.31E-03	No	2.00E+01	8.50E-03	No
Chromium, Total	1.00E+01	1.00E+00	1.00E+01	Yes	4.00E-01	2.50E+01	Yes
Cobalt	1.80E+00	1.30E+01	1.38E-01	No	2.00E+01	9.00E-02	No
Copper	4.50E+00	1.00E+02	4.50E-02	No	5.00E+01	9.00E-02	No
Iron	4.80E+03, pH 7.7-9	5<pH<8	pH>8	Yes	5<pH<8	pH>8	Yes
Lead	1.10E+01	1.20E+02	9.17E-02	No	1.70E+03	6.47E-03	No
Manganese	2.70E+02	5.00E+02	5.40E-01	No	1.00E+02	2.70E+00	Yes
Mercury	8.70E-03	3.00E-01	2.90E-02	No	1.00E-01	8.70E-02	No
Nickel	4.10E+00	3.00E+01	1.37E-01	No	2.00E+02	2.05E-02	No
Vanadium	1.30E+01	2.00E+00	6.50E+00	Yes	2.00E+00	6.50E+00	Yes
Zinc	2.80E+01	5.00E+01	5.60E-01	No	2.00E+02	1.40E-01	No
Polychlorinated Biphenyls							
PCB-1248	7.30E+05	4.00E+04	1.83E+01	Yes	2.51E+03	2.91E+02	Yes
PCB-1254	1.90E+05	4.00E+04	4.75E+00	Yes	2.51E+03	7.57E+01	Yes
PCB-1260	2.10E+05	4.00E+04	5.25E+00	Yes	2.51E+03	8.37E+01	Yes
Semivolatile Organics							
1,2-Benzphenanthrene	2.40E+04	1.20E+03	2.00E+01	Yes	2.50E+04	9.60E-01	No
2-Methylnaphthalene	9.00E+02	3.00E+01	3.00E+01	Yes	5.40E+02	1.67E+00	Yes
Acenaphthene	4.20E+03	2.00E+04	2.10E-01	No	1.40E+04	3.00E-01	No
Acenaphthylene	2.10E+03	2.00E+04	1.05E-01	No	1.40E+04	1.50E-01	No
Acetophenone	1.70E+02	3.00E+04	5.67E-03	No	3.00E+04	5.67E-03	No
Anthracene	6.20E+03	1.20E+03	5.17E+00	Yes	2.50E+04	2.48E-01	No
Benzaldehyde	4.50E+01	No Screening Value		Yes	No Screening Value		Yes
Benzo(a)anthracene	1.70E+04	1.20E+03	1.42E+01	Yes	2.50E+04	6.80E-01	No
Benzo(a)pyrene	2.00E+04	1.20E+03	1.67E+01	Yes	2.50E+04	8.00E-01	No
Benzo(b)fluoranthene	2.40E+04	1.20E+03	2.00E+01	Yes	2.50E+04	9.60E-01	No
Benzo(g,h,i)perylene	1.20E+04	1.20E+03	1.00E+01	Yes	2.50E+04	4.80E-01	No
Benzo(k)fluoranthene	2.10E+04	1.20E+03	1.75E+01	Yes	2.50E+04	8.40E-01	No
Bis(2-ethylhexyl)phthalate	7.70E+02	1.00E+02	7.70E+00	Yes	1.00E+02	7.70E+00	Yes
Carbazole	5.70E+03	No Screening Value		Yes	1.70E+04	3.35E-01	No
Dibenz(a,h)anthracene	6.50E+03	1.20E+03	5.42E+00	Yes	2.50E+04	2.60E-01	No
Dibenzofuran	3.20E+03	No Screening Value		Yes	1.40E+04	2.29E-01	No
Di-n-butylphthalate	1.80E+02	2.00E+05	9.00E-04	No	3.05E+04	5.90E-03	No
Fluoranthene	4.50E+04	1.20E+03	3.75E+01	Yes	2.10E+04	2.14E+00	Yes
Fluorene	3.40E+03	1.20E+03	2.83E+00	Yes	1.40E+04	2.43E-01	No
Indeno(1,2,3-cd)pyrene	1.50E+04	1.20E+03	1.25E+01	Yes	2.50E+04	6.00E-01	No
Naphthalene	1.30E+03	3.00E+01	4.33E+01	Yes	5.40E+02	2.41E+00	Yes
Phenanthrene	4.70E+04	1.20E+03	3.92E+01	Yes	2.10E+04	2.24E+00	Yes

TABLE F-15
Surface Soil Screening Statistics—Step 2—Future Redevelopment
OMC Plant 2

Chemical	Maximum Concentration	Soil Flora Screening Value	Soil Flora HQ	Retained as a Step 2 COPEC?	Soil Fauna Screening Value	Soil Fauna HQ	Retained as a Step 2 COPEC?
Phenol	2.00E+04	7.00E+04	2.86E-01	No	1.00E+05	2.00E-01	No
Pyrene	4.50E+04	1.20E+03	3.75E+01	Yes	1.30E+04	3.46E+00	Yes
Volatile Organics							
Acetone	5.40E+01	2.50E+03	2.16E-02	No	2.50E+03	2.16E-02	No
Benzene	1.50E+01	2.40E+02	6.25E-02	No	1.61E+03	9.32E-03	No
Carbon Disulfide	6.00E+00	9.41E+01	6.38E-02	No	9.41E+01	6.38E-02	No
Cyclohexane	7.00E+00	3.05E+03	2.30E-03	No	3.05E+03	2.30E-03	No
cis-1,2-Dichloroethylene	1.30E+01	7.84E+02	1.66E-02	No	7.84E+02	1.66E-02	No
Dichloromethane	5.00E+00	2.00E+03	2.50E-03	No	2.00E+03	2.50E-03	No
Methylbenzene	6.80E+01	7.00E+01	9.71E-01	No	4.40E+02	1.55E-01	No
Trichloroethylene	1.60E+02	1.40E+02	1.14E+00	Yes	7.90E+02	2.03E-01	No

TABLE F-16
Bird and Mammal Hazard Quotients—Step 2—Current Use
OMC Plant 2

Chemical	Short-tailed shrew	Meadow vole	Red fox	American robin	Mourning dove	Red-tailed hawk
Inorganics						
Arsenic	3.56E+00	4.87E+00	<1.00E-02	9.64E-02	4.10E-01	<1.00E-02
Cadmium	8.59E-01	5.61E-02	4.07E-02	3.67E-01	6.26E-02	1.81E-02
Chromium	1.25E+00	3.33E-02	5.10E-02	2.47E+00	2.21E-01	1.33E-01
Copper	1.20E-02	<1.00E-02	2.26E-02	1.16E-02	1.05E-02	<1.00E-02
Lead	2.84E-01	6.82E-02	1.92E-02	3.45E-01	8.19E-01	3.10E-02
Mercury	6.99E-01	1.38E-01	<1.00E-02	2.82E-02	1.58E-02	<1.00E-02
Nickel	6.19E-02	1.48E-02	<1.00E-02	1.95E-02	1.25E-02	<1.00E-02
Zinc	2.82E-01	3.25E-02	1.70E-01	1.92E+00	5.85E-01	2.08E-01
Polychlorinated Biphenyls						
PCB-1248	2.13E+04	2.66E+01	7.81E+02	2.19E+03	3.45E+01	2.28E+02
PCB-1254	5.55E+03	6.93E+00	2.03E+02	5.69E+02	8.98E+00	5.95E+01
PCB-1260	6.13E+03	7.65E+00	2.25E+02	6.29E+02	9.93E+00	6.57E+01
Semivolatile Organics						
Acenaphthene	<1.00E-02	<1.00E-02	<1.00E-02	7.17E-02	2.28E-02	1.00E-02
Acenaphthylene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	1.56E-02	<1.00E-02
Anthracene	<1.00E-02	<1.00E-02	<1.00E-02	6.78E-02	9.72E-02	1.24E-02
Benzo(a)anthracene	2.44E+00	1.83E-01	2.60E-01	1.62E-01	7.13E-02	2.38E-02
Benzo(a)pyrene	2.42E+00	5.67E-01	2.78E-01	1.68E-01	1.54E-01	2.72E-02
Benzo(b)fluoranthene	2.27E+00	1.72E+00	3.68E-01	1.43E-01	4.21E-01	3.62E-02
Benzo(g,h,i)perylene	1.19E+00	2.47E+00	3.17E-01	6.87E-02	5.79E-01	3.32E-02
Benzo(k)fluoranthene	1.29E+00	2.82E-01	1.57E-01	8.11E-02	8.23E-02	1.43E-02
Dibenz(a,h)anthracene	1.03E+00	2.02E-01	1.10E-01	7.58E-02	5.41E-02	1.12E-02
Fluoranthene	1.93E-02	1.58E-02	<1.00E-02	6.79E-01	1.89E+00	1.60E-01
Fluorene	<1.00E-02	<1.00E-02	<1.00E-02	4.57E-02	2.04E-02	<1.00E-02
Indeno(1,2,3-cd)pyrene	1.87E+00	3.66E-01	2.04E-01	1.34E-01	1.00E-01	2.03E-02
Phenanthrene	2.12E-02	<1.00E-02	<1.00E-02	7.11E-01	7.55E-01	1.22E-01
Pyrene	9.34E+00	1.05E+01	1.67E+00	6.64E-01	2.46E+00	1.80E-01

TABLE F-17

Bird and Mammal Hazard Quotients—Step 2—Future Development

OMC Plant 2

Chemical	Short-tailed shrew	Meadow vole	Red fox	American robin	Mourning dove	Red-tailed hawk
Inorganics						
Arsenic	3.56E+00	4.87E+00	<1.00E-02	9.64E-02	4.10E-01	<1.00E-02
Cadmium	8.59E-01	5.61E-02	4.07E-02	3.67E-01	6.26E-02	1.81E-02
Chromium	1.25E+00	3.33E-02	5.10E-02	2.47E+00	2.21E-01	1.33E-01
Copper	1.20E-02	<1.00E-02	2.26E-02	1.16E-02	1.05E-02	<1.00E-02
Lead	2.84E-01	6.82E-02	1.92E-02	3.45E-01	8.19E-01	3.10E-02
Mercury	7.63E-01	1.50E-01	<1.00E-02	3.08E-02	1.72E-02	<1.00E-02
Nickel	6.19E-02	1.48E-02	<1.00E-02	1.95E-02	1.25E-02	<1.00E-02
Zinc	2.82E-01	3.25E-02	1.70E-01	1.92E+00	5.85E-01	2.08E-01
Polychlorinated Biphenyls						
PCB-1248	2.13E+04	2.66E+01	7.81E+02	2.19E+03	3.45E+01	2.28E+02
PCB-1254	5.55E+03	6.93E+00	2.03E+02	5.69E+02	8.98E+00	5.95E+01
PCB-1260	6.13E+03	7.65E+00	2.25E+02	6.29E+02	9.93E+00	6.57E+01
Semivolatile Organics						
Acenaphthene	<1.00E-02	<1.00E-02	<1.00E-02	1.58E-02	<1.00E-02	<1.00E-02
Acenaphthylene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	1.56E-02	<1.00E-02
Anthracene	<1.00E-02	<1.00E-02	<1.00E-02	2.47E-02	4.25E-02	<1.00E-02
Benzo(a)anthracene	8.82E-01	7.83E-02	9.51E-02	5.86E-02	2.86E-02	<1.00E-02
Benzo(a)pyrene	1.21E+00	2.87E-01	1.39E-01	8.41E-02	7.77E-02	1.36E-02
Benzo(b)fluoranthene	1.07E+00	8.09E-01	1.73E-01	6.71E-02	1.98E-01	1.70E-02
Benzo(g,h,i)perylene	4.44E-01	7.80E-01	1.08E-01	2.58E-02	1.84E-01	1.11E-02
Benzo(k)fluoranthene	9.34E-01	2.11E-01	1.14E-01	5.87E-02	6.12E-02	1.04E-02
Dibenz(a,h)anthracene	5.14E-01	1.01E-01	5.49E-02	3.79E-02	2.70E-02	<1.00E-02
Fluoranthene	<1.00E-02	<1.00E-02	<1.00E-02	2.04E-01	5.66E-01	4.79E-02
Fluorene	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02	<1.00E-02
Indeno(1,2,3-cd)pyrene	1.04E+00	2.03E-01	1.13E-01	7.44E-02	5.55E-02	1.13E-02
Phenanthrene	<1.00E-02	<1.00E-02	<1.00E-02	1.67E-01	2.66E-01	3.22E-02
Pyrene	3.00E+00	3.37E+00	5.38E-01	2.14E-01	7.92E-01	5.80E-02

TABLE F-18
Soil Bioconcentration Factors—COPEC Refinement
OMC Plant 2

Chemical	Kow		Soil-Plant BCF (dry weight)		Soil-Invertebrate BAF (dry weight)		Soil-Vole BAF (dry weight)		Soil-Shrew BAF (dry weight)	
	Value	Reference	Value	Reference	Value	Reference	Value	Reference	Value	Reference
Inorganics										
Arsenic	--	--	3.71E-02	Geometric mean; Bechtel Jacobs, 1998	2.58E-01	Arithmetic mean; Sample et al., 1998a	5.42E-03	Geometric mean; Sample et al., 1998b	3.87E-03	Geometric mean; Sample et al., 1998b
Chromium	--	--	4.75E-02	Geometric mean; Bechtel Jacobs, 1998	3.20E-01	Geometric mean; Sample et al., 1998a	8.84E-02	Geometric mean; Sample et al., 1998b	9.39E-02	Geometric mean; Sample et al., 1998b
Zinc	--	--	3.58E-01	Geometric mean; Bechtel Jacobs, 1998	2.48E+00	Geometric mean; Sample et al., 1998a	2.93E-01	Geometric mean; Sample et al., 1998b	8.62E-01	Geometric mean; Sample et al., 1998b
Polychlorinated Biphenyls										
PCB-1248	6.20E+00	Jones et al., 1997	3.31E-05	USEPA, 2005h	4.30E+00	Geometric mean; Sample et al., 1998a	--	see text	--	see text
PCB-1254	6.50E+00	Jones et al., 1997	2.01E-05	USEPA, 2005h	4.30E+00	Geometric mean; Sample et al., 1998a	--	see text	--	see text
PCB-1260	6.80E+00	Jones et al., 1997	1.22E-05	USEPA, 2005h	4.30E+00	Geometric mean; Sample et al., 1998a	--	see text	--	see text
Semivolatile Organics										
Benzo(a)anthracene	--	--	regression equation	USEPA, 2005h	2.70E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(a)pyrene	--	--	regression equation	USEPA, 2005h	3.40E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(b)fluoranthene	--	--	3.10E-01	USEPA, 2005h	2.10E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(g,h,i)perylene	--	--	6.09E-03	USEPA, 2005h	1.50E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Benzo(k)fluoranthene	--	--	regression equation	USEPA, 2005h	2.10E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Dibenz(a,h)anthracene	--	--	1.30E-01	USEPA, 2005h	4.90E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Fluoranthene	--	--	5.00E-01	USEPA, 2005h	3.70E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Indeno(1,2,3-cd)pyrene	--	--	1.10E-01	USEPA, 2005h	4.10E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text
Pyrene	--	--	7.20E-01	USEPA, 2005h	3.90E-01	Medain; Beyer and Stafford, 1993	--	see text	--	see text

TABLE F-19

Dietary Concentrations—COPEC Refinement

OMC Plant 2

Chemical	Terr. Plant (mg/kg dry weight)		Soil Invert. (mg/kg dry weight)		Vole (mg/kg dry weight)		Shrew (mg/kg dry weight)	
	Current	Future	Current	Future	Current	Future	Current	Future
Inorganics								
Arsenic	8.04E-02	8.04E-02	5.60E-01	5.60E-01	--	--	--	--
Chromium	2.44E-01	2.44E-01	1.64E+00	1.64E+00	--	--	--	--
Zinc	6.52E+00	6.52E+00	4.52E+01	4.52E+01	--	--	--	--
Polychlorinated Biphenyls								
PCB-1248	7.05E-04	5.71E-04	9.14E+01	7.41E+01	3.57E-01	2.89E-01	2.16E+01	1.75E+01
PCB-1254	1.24E-04	9.83E-05	2.65E+01	2.10E+01	1.03E-01	8.20E-02	6.25E+00	4.96E+00
PCB-1260	6.75E-05	5.42E-05	2.38E+01	1.91E+01	9.27E-02	7.44E-02	5.61E+00	4.50E+00
Semivolatile Organics								
Benzo(a)anthracene	9.90E-02	--	5.25E-01	--	--	--	--	--
Benzo(a)pyrene	2.82E-01	3.69E-01	7.70E-01	1.01E+00	--	--	--	--
Benzo(b)fluoranthene	7.71E-01	1.09E+00	5.22E-01	7.37E-01	--	--	--	--
Benzo(g,h,i)perylene	7.50E-01	--	2.58E-01	--	--	--	--	--
Benzo(k)fluoranthene	2.01E-01	--	4.01E-01	--	--	--	--	--
Dibenz(a,h)anthracene	1.97E-01	--	7.43E-01	--	--	--	--	--
Fluoranthene	2.03E+00	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	2.07E-01	2.76E-01	7.72E-01	1.03E+00	--	--	--	--
Pyrene	2.89E+00	4.65E+00	1.57E+00	2.52E+00	4.41E-01	--	5.38E-01	--

TABLE F-20

Exposure Parameters for Upper Trophic Level Ecological Receptors—COPEC Refinement

OMC Plant 2

Receptor	Average Body Weight (kg)		Food Ingestion Rate (kg/day - dry)		Dietary Composition (percent)					Soil Ingestion (percent)	
	Value	Reference	Value	Reference	Terr. Plants	Soil Invert.	Vole	Shrew	Reference	Value	Reference
Mammals											
Short-tailed shrew	0.017	avg mean for M/F - PA; USEPA, 1993	0.0015	55.5% of mean BW; USEPA, 1993	4.7	82.3	0	0	USEPA, 1993a; Sample and Suter, 1994	13.0	Sample and Suter, 1994
Meadow vole	0.043	mean for M/F - MD; Silva and Downing, 1995	0.0021	32.5% of mean BW; USEPA, 1993	95.6	2	0	0	USEPA, 1993a	2.4	Beyer et al., 1994
Red fox	4.06	mean for M/F - VA; Silva and Downing, 1995	0.1231	10% of mean BW; Sample and Suter, 1994	7.0	2.8	43.7	43.7	USEPA, 1993a	2.8	Beyer et al., 1994
Birds											
American robin	0.077	avg for M/F - PA; USEPA, 1993	0.0055	weighted by diet component; Levey and Karasov, 1989	51.9	43.5	0	0	Martin et al., 1951	4.6	Sample and Suter, 1994
Mourning dove	0.127	avg for M/F; Tomlinson et al., 1994	0.0151	allometric equation for birds based on avg BW; USEPA, 1993	95	0	0	0	Tomlinson et al., 1994	5.0	Assumed based on diet
Red-tailed hawk	1.13	average; USEPA, 1993	0.0360	10% of avg BW; Sample and Suter, 1994	0	0	50	50	USEPA, 1993a; Sample and Suter, 1994	0	Sample and Suter, 1994

BW = Body Weight

M = Male

F = Female

TABLE F-21
Surface Soil Screening Statistics—COPEC Refinement—Current Use
OMC Plant 2

Chemical	Average Concentration	Soil Flora		Soil Fauna	
		Screening Value	HQ	Screening Value	HQ
Inorganics					
Chromium, Total	5.13E+00	1.00E+00	5.13E+00	4.00E-01	1.28E+01
Iron	3.35E+03, pH of 8.5	5<pH<8	pH>8	5<pH<8	pH>8
Manganese	1.08E+02	--	--	1.00E+02	1.08E+00
Vanadium	7.94E+00	2.00E+00	3.97E+00	2.00E+00	3.97E+00
Polychlorinated Biphenyls					
PCB-1248	1.72E+04	4.00E+04	4.31E-01	2.51E+03	6.87E+00
PCB-1254	4.89E+03	4.00E+04	1.22E-01	2.51E+03	1.95E+00
PCB-1260	4.44E+03	4.00E+04	1.11E-01	2.51E+03	1.77E+00
Semivolatile Organics					
1,2-Benzphenanthrene	3.94E+03	1.20E+03	3.28E+00	2.50E+04	1.58E-01
2-Methylnaphthalene	3.56E+02	3.00E+01	1.19E+01	5.40E+02	6.59E-01
Acenaphthene	1.48E+03	--	--	1.40E+04	1.06E-01
Anthracene	1.61E+03	1.20E+03	1.34E+00	--	--
Benzo(a)anthracene	2.81E+03	1.20E+03	2.34E+00	2.50E+04	1.12E-01
Benzo(a)pyrene	2.98E+03	1.20E+03	2.48E+00	2.50E+04	1.19E-01
Benzo(b)fluoranthene	3.51E+03	1.20E+03	2.92E+00	2.50E+04	1.40E-01
Benzo(g,h,i)perylene	2.30E+03	1.20E+03	1.92E+00	2.50E+04	9.21E-02
Benzo(k)fluoranthene	2.49E+03	1.20E+03	2.08E+00	2.50E+04	9.97E-02
Bis(2-ethylhexyl)phthalate	1.34E+03	1.00E+02	1.34E+01	1.00E+02	1.34E+01
Carbazole	1.58E+03	No Screening Value		1.70E+04	9.27E-02
Dibenz(a,h)anthracene	1.77E+03	1.20E+03	1.48E+00	--	--
Dibenzofuran	1.44E+03	No Screening Value		1.40E+04	1.03E-01
Fluoranthene	6.87E+03	1.20E+03	5.73E+00	2.10E+04	3.27E-01
Fluorene	1.52E+03	1.20E+03	1.27E+00	1.40E+04	1.09E-01
Indeno(1,2,3-cd)pyrene	2.51E+03	1.20E+03	2.09E+00	2.50E+04	1.00E-01
Naphthalene	1.30E+03	3.00E+01	4.33E+01	5.40E+02	2.40E+00
Phenanthrene	6.52E+03	1.20E+03	5.43E+00	2.10E+04	3.10E-01
Pyrene	6.45E+03	1.20E+03	5.38E+00	1.30E+04	4.96E-01
Volatile Organics					
Trichloroethylene	1.18E+01	1.40E+02	8.46E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE F-22

Surface Soil Screening Statistics—COPEC Refinement—Future Redevelopment

OMC Plant 2

Chemical	Average Concentration	Soil Flora Screening Value	Soil Flora HQ	Soil Fauna Screening Value	Soil Fauna HQ
Inorganics					
Chromium, Total	5.13E+00	1.00E+00	5.13E+00	4.00E-01	1.28E+01
Iron	3.35E+03, pH of 8.5	5<pH<8	pH>8	5<pH<8	pH>8
Manganese	1.08E+02	--	--	1.00E+02	1.08E+00
Vanadium	7.94E+00	2.00E+00	3.97E+00	2.00E+00	3.97E+00
Polychlorinated Biphenyls					
PCB-1248	2.13E+04	4.00E+04	5.32E-01	2.51E+03	8.48E+00
PCB-1254	6.16E+03	4.00E+04	1.54E-01	2.51E+03	2.45E+00
PCB-1260	5.53E+03	4.00E+04	1.38E-01	2.51E+03	2.20E+00
Semivolatile Organics					
1,2-Benzphenanthrene	2.26E+03	1.20E+03	1.88E+00	--	--
2-Methylnaphthalene	1.49E+02	3.00E+01	4.98E+00	5.40E+02	2.77E-01
Anthracene	1.34E+03	1.20E+03	1.11E+00	--	--
Benzaldehyde	1.70E+02	No Screening Value		No Screening Value	
Benzo(a)anthracene	1.95E+03	1.20E+03	1.62E+00	--	--
Benzo(a)pyrene	2.27E+03	1.20E+03	1.89E+00	--	--
Benzo(b)fluoranthene	2.49E+03	1.20E+03	2.07E+00	--	--
Benzo(g,h,i)perylene	1.72E+03	1.20E+03	1.44E+00	--	--
Benzo(k)fluoranthene	1.91E+03	1.20E+03	1.59E+00	--	--
Bis(2-ethylhexyl)phthalate	1.71E+02	1.00E+02	1.71E+00	1.00E+02	1.71E+00
Carbazole	1.33E+03	No Screening Value		--	--
Dibenz(a,h)anthracene	1.52E+03	1.20E+03	1.26E+00	--	--
Dibenzofuran	3.94E+02	No Screening Value		--	--
Fluoranthene	4.05E+03	1.20E+03	3.38E+00	2.10E+04	1.93E-01
Fluorene	4.31E+02	1.20E+03	3.59E-01	--	--
Indeno(1,2,3-cd)pyrene	1.88E+03	1.20E+03	1.57E+00	--	--
Naphthalene	1.64E+02	3.00E+01	5.48E+00	5.40E+02	3.04E-01
Phenanthrene	3.35E+03	1.20E+03	2.79E+00	2.10E+04	1.60E-01
Pyrene	4.02E+03	1.20E+03	3.35E+00	1.30E+04	3.09E-01
Volatile Organics					
Trichloroethylene	1.14E+01	1.40E+02	8.13E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE F-23
Bird and Mammal Hazard Quotients—COPEC Refinement—Current Use
OMC Plant 2

Chemical	Short-tailed shrew		Meadow vole		Red fox		American robin		Mourning dove		Red-tailed hawk	
	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics												
Arsenic	2.62E-01	5.24E-02	2.71E-02	<1.00E-02	--	--	--	--	--	--	--	--
Chromium	5.48E-02	1.10E-02	--	--	--	--	7.69E-02	1.54E-02	--	--	--	--
Zinc	--	--	--	--	--	--	1.18E-01	1.30E-02	--	--	--	--
Polychlorinated Biphenyls												
PCB-1248	1.02E+02	1.02E+01	1.68E+00	1.68E-01	2.76E+00	5.60E-01	7.10E+00	7.10E-01	7.08E-01	7.08E-02	8.56E-01	8.56E-02
PCB-1254	2.94E+01	2.94E+00	4.86E-01	4.86E-02	7.99E-01	1.62E-01	2.06E+00	2.06E-01	2.05E-01	2.05E-02	2.48E-01	2.48E-02
PCB-1260	2.64E+01	2.64E+00	4.36E-01	4.36E-02	7.17E-01	1.45E-01	1.85E+00	1.85E-01	1.84E-01	1.84E-02	2.22E-01	2.22E-02
Semivolatile Organics												
Benzo(a)anthracene	6.10E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	8.33E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	6.99E-02	<1.00E-02	3.94E-02	<1.00E-02	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	4.18E-02	<1.00E-02	3.73E-02	<1.00E-02	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	5.20E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	7.24E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Fluoranthene	--	--	--	--	--	--	--	--	3.59E-02	<1.00E-02	--	--
Indeno(1,2,3-cd)pyrene	7.88E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Pyrene	1.72E-01	1.72E-02	1.41E-01	1.41E-02	2.39E-02	<1.00E-02	--	--	4.97E-02	<1.00E-02	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE F-24
Bird and Mammal Hazard Quotients—COPEC Refinement—Future Redevelopment
OMC Plant 2

	Short-tailed shrew		Meadow vole		Red fox		American robin		Mourning dove		Red-tailed hawk	
Chemical	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL	NOAEL	LOAEL
Inorganics												
Arsenic	2.62E-01	5.24E-02	2.71E-02	<1.00E-02	--	--	--	--	--	--	--	--
Chromium	5.48E-02	1.10E-02	--	--	--	--	7.69E-02	1.54E-02	--	--	--	--
Zinc	--	--	--	--	--	--	1.18E-01	1.30E-02	--	--	--	--
Polychlorinated Biphenyls												
PCB-1248	8.22E+01	8.22E+00	1.36E+00	1.36E-01	2.23E+00	4.53E-01	5.75E+00	5.75E-01	5.74E-01	5.74E-02	6.93E-01	6.93E-02
PCB-1254	2.33E+01	2.33E+00	3.86E-01	3.86E-02	6.34E-01	1.29E-01	1.63E+00	1.63E-01	1.63E-01	1.63E-02	1.97E-01	1.97E-02
PCB-1260	2.12E+01	2.12E+00	3.50E-01	3.50E-02	5.75E-01	1.17E-01	1.48E+00	1.48E-01	1.48E-01	1.48E-02	1.78E-01	1.78E-02
Semivolatile Organics												
Benzo(a)pyrene	1.10E-01	1.10E-02	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	9.86E-02	<1.00E-02	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	1.05E-01	1.05E-02	--	--	--	--	--	--	--	--	--	--
Pyrene	2.77E-01	2.77E-02	--	--	--	--	--	--	--	--	--	--

-- = Not applicable because chemical is not a COPEC from the Step 2 screening.

TABLE F-25

Surface Soil Inorganics Comparison to Background—COPEC Refinement

OMC Plant 2

Chemical	Background Concentration (mg/kg)	Maximum Concentration (mg/kg)	Average Concentration (mg/kg)	Maximum/ Background Ratio	Average/ Background Ratio
Current Scenario					
Chromium, Total	1.62E+01	1.00E+01	5.13E+00	6.17E-01	3.17E-01
Iron	1.59E+04	4.80E+03	3.35E+03	3.02E-01	2.11E-01
Manganese	6.36E+02	2.70E+02	1.08E+02	4.25E-01	1.69E-01
Vanadium	2.52E+01	1.30E+01	7.94E+00	5.16E-01	3.15E-01
Future Development					
Chromium, Total	1.62E+01	1.00E+01	5.13E+00	6.17E-01	3.17E-01
Iron	1.59E+04	4.80E+03	3.35E+03	3.02E-01	2.11E-01
Manganese	6.36E+02	2.70E+02	1.08E+02	4.25E-01	1.69E-01
Vanadium	2.52E+01	1.30E+01	7.94E+00	5.16E-01	3.15E-01

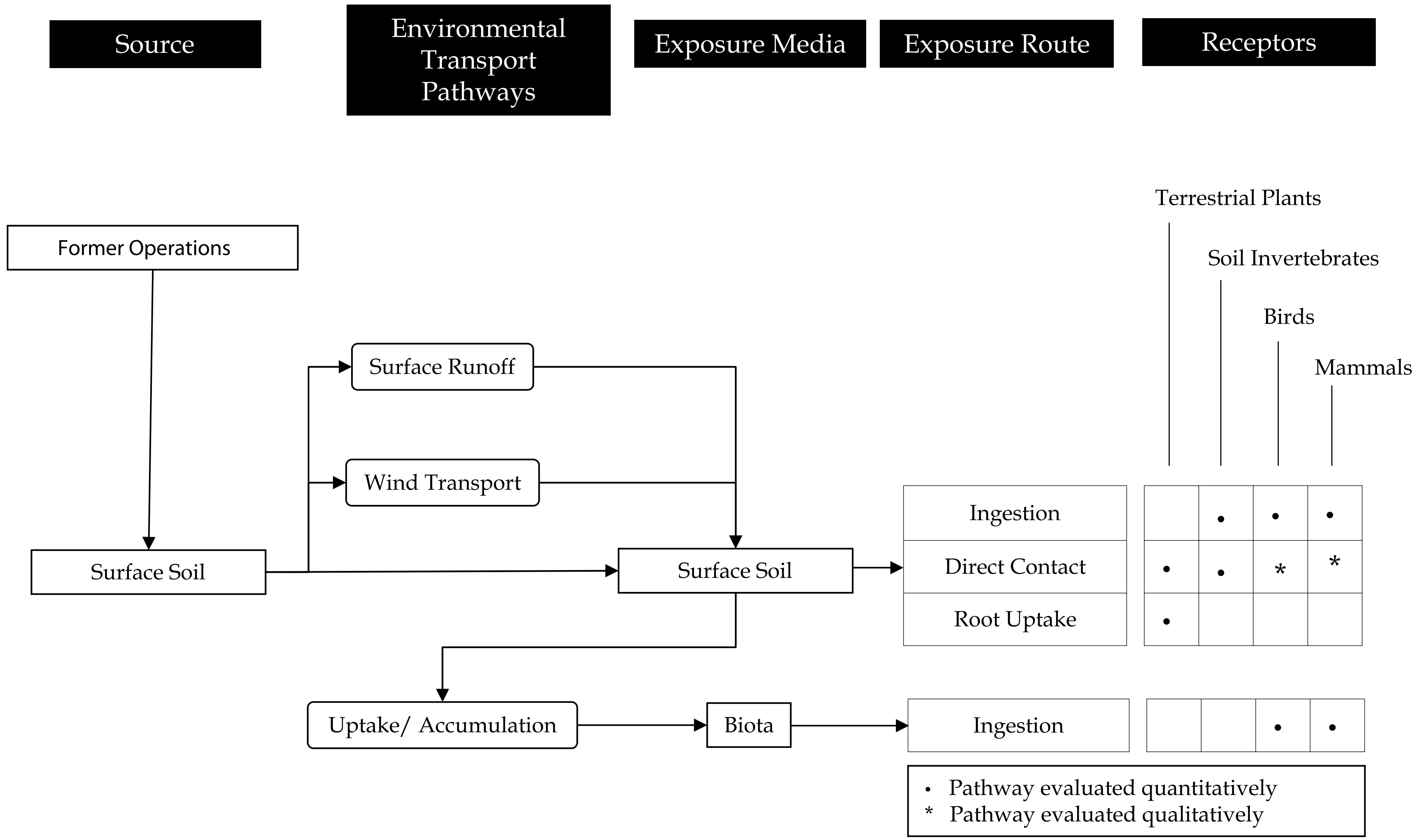

FIGURE F-1
Preliminary Ecological Conceptual Model
OMC Plant 2
Waukegan, Illinois